This document provides pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Major, Municipal permit. The discharge results from the operation of a 2.5 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia Water Quality Standards (effective 6 January 2011) and updating permit language as appropriate. The effluent limitations and special conditions contained within this permit will maintain the Water Quality Standards of 9VAC25-260 et seq.

1.	Facility Name and Mailing Address:	Town of Warrenton Wastewater Treatment Plant P.O. Drawer 341 Warrenton, VA 20188	SIC Code:	4952 WWTP
	Facility Location:	731 Frost Avenue Warrenton, VA 20186	County:	Fauquier
	Facility Contact Name:	Allen Chichester	Telephone Number:	540-347-1104
	Facility Contact Title:	Wastewater Superintendent		
	Facility Email Address:	achichester@warrentonva.gov		
2.	Permit No.:	VA0021172	Expiration Date:	26 April 2016
	Other VPDES Permits:	VAN020028 – Nutrient General Permit VAR040124 – MS4 General Permit		
	Other Permits:	Registration Number 40883 – DEQ-NRO Air Permit Registration Number 3025198 – DEQ-NRO Petroleum Registration		
	E2/E3/E4 Status:	Not Applicable		
3.	Owner Name:	Town of Warrenton		
	Owner Contact:	Edward Tucker, Jr.	Telephone Number:	540-347-1858
	Owner Title:	Director of Public Works and Utilities		
	Owner Email Address:	etucker@warrrentonva.gov		
4.	Application Complete Date:	28 October 2015		
	Permit Drafted By:	Douglas Frasier	Date Drafted:	1 March 2016
	Draft Permit Reviewed By:	Caitlin Shipman	Date Reviewed:	7 March 2016
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	5 April 2016
	Public Comment Period:	Start Date: 2 June 2016	End Date:	5 July 2016
5.	Receiving Waters Information:	See **Attachment 1** for the Flow Frequency Determination.		
	Receiving Stream Name:	Great Run, UT	Stream Code:	3-XHS
	Drainage Area at Outfall:	1.24 square miles	River Mile:	0.26
	Stream Basin:	Rappahannock River	Subbasin:	None
	Section:	4	Stream Class:	III
	Special Standards:	None	Waterbody ID:	VAN-E02R / RA07
	7Q10 Low Flow:	0.013 MGD	7Q10 High Flow:	0.125 MGD
	1Q10 Low Flow:	0.011 MGD	1Q10 High Flow:	0.101 MGD
	30Q10 Low Flow:	0.025 MGD	30Q10 High Flow:	0.176 MGD
	Harmonic Mean Flow:	0.199 MGD	30Q5 Flow:	0.041 MGD

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6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

X	State Water Control Law		EPA Guidelines
X	Clean Water Act	X	Water Quality Standards
X	VPDES Permit Regulation	X	9VAC25-820 et seq. *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*
X	EPA NPDES Regulation		

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Facility / Permit Characterization:

	Private	X	Effluent Limited		Possible Interstate Effect
	Federal	X	Water Quality Limited		Compliance Schedule
	State	X	Whole Effluent Toxicity Program		Interim Limits in Permit
X	POTW	X	Pretreatment Program		Interim Limits in Other Document
X	eDMR Participant	X	Total Maximum Daily Load (TMDL)		

10. Wastewater Sources and Treatment Description:

The Town of Warrenton Wastewater Treatment Plant consists of preliminary, primary, secondary and tertiary treatment stages. This treatment plant serves a population of approximately 12,832 people.

The influent wastewater undergoes physical treatment in the first two stages including screening, grit removal and primary sludge removal. The secondary stage includes the existing trickling filter and rotating biological contactors (RBC) providing biochemical oxygen demand (BOD) removal and nitrification. In the nitrification process, the ammonia-nitrogen and most of the organic nitrogen in the wastewater is oxidized to nitrate-nitrogen. The suspended solids from the RBC process settle in the secondary clarifiers, aided by chemical addition. Phosphorus removal is controlled through chemical addition and precipitation in the secondary clarifiers. Nitrified effluent from the secondary clarifier enters the tertiary treatment stage which was added as part of the "Nutrient Removal Upgrade" in 2009; Certificate to Operate issued on 13 November 2009. This stage provides final nitrogen removal through a biological denitrification process consisting of deep-bed denitrifying filters with coarse sand media also providing partial removal of remaining suspended solids prior to disinfection via ultraviolet (UV) radiation and final plant discharge.

In 2009, the Town inquired DEQ staff regarding the possible termination of the General VPDES Permit for Stormwater Discharges Associated with Industrial Activity, VAR051465, for this facility. A site review was conducted by DEQ staff on 11 June 2009 and it was determined that stormwater discharges from the facility are sheet flow in nature and are not subject to VPDES permitting requirements. Subsequently, the aforementioned General Permit was terminated; effective 29 June 2009.

See **Attachment 2** for the stormwater general permit termination memo and correspondence.

See **Attachment 3** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Number	Discharge Sources	Treatment	Design Flow	Latitude / Longitude
001	Domestic and Commercial Wastewater	See Section 10	2.5 MGD	38° 42′ 58.5″ / 77° 48′ 55.3″

See **Attachment 4** for the Warrenton topographic map.

11. Sludge Treatment and Disposal Methods:

The primary and secondary sludges are blended in a gravity thickener. Sludge is then pumped to a primary anaerobic digester with a maintained temperature of 95° F. The sludge is then transferred to a secondary digester where it is held for solids dewatering via belt press. The cake sludge is then held on site in covered sludge drying beds which have drainage routed back to the head of the plant. Synagro Central, LLC is notified when two drying beds are at capacity and subsequently land applies the sludge under VPA Permit No. VPA00062.

12. Other Permitted Discharges Located Within Waterbody VAN-E02R:

TABLE 2
PERMITTED DISCHARGES

Permit Number	Facility Name	Type	Receiving Stream
VA0076805	Remington Wastewater Treatment Plant	Municipal Discharge Individual Permits	Rappahannock River
VA0080527	Clevengers Village Wastewater Treatment Plant		Rappahannock River
VA0031763	Marshall Wastewater Treatment Plant		Carter Run, UT
VA0077411	Fauquier Springs Country Club Sewage Treatment Plant		Rappahannock River
VAR051721	Blue Triangle Hardwoods	Stormwater Industrial General Permit	Rappahannock River, UT
VAG406334	Yates Residence	Small Municipal ≤ 1,000 gpd General Permits	Borrows Run, UT
VAG406058	Hawkins Residence		Carter Run, UT
VAG406490	Ellsworth Residence		Rappahannock River, UT
VAG406066	Kipps Residence		Marsh Run

13. Material Storage:

TABLE 3
MATERIAL STORAGE

Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Methanol	4,000 gallons	Concrete container
Polyaluminum chloride	2,500 gallons	No containment
Diesel fuel	3,500 gallons	Steel structure containment
Soda ash	1,400 pounds	Enclosed building
Praestol 857 polymer	1,200 pounds	

14. Site Inspection:

A technical inspection was performed by DEQ-NRO Compliance Staff on 5 November 2015.

Please refer to **Attachment 5** for the inspection report.

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15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

This facility discharges to an unnamed tributary to Great Run (streamcode XHS) that has not been monitored or assessed. The unnamed tributary to Great Run (streamcode XAC) is located approximately 0.26 miles downstream from Outfall 001 and DEQ ambient monitoring station 3-XAC000.58 is located on stream at Route 802; approximately 1.1 miles downstream from Outfall 001. The following is the water quality summary for this segment of XAC, as taken from the Draft 2014 Integrated Report:

- Class III, Section 4;
- DEQ monitoring stations located in this segment of the unnamed tributary to Great Run (streamcode XAC): ambient monitoring station 3-XAC000.58, at Route 802;
- The aquatic life use is listed as supporting with an observed effect based on temperature data;
- The recreational use is listed as insufficient with an observed effect;
- The wildlife use was not assessed; and
- The fish consumption use is categorized as not assessed.

b. 303(d) Listed Stream Segments and Total Maximum Daily Loads (TMDLs)

TABLE 4
DOWNSTREAM 303(d) IMPAIRMENTS AND TMDLs

Waterbody Name	Impaired Use	Cause	TMDL Completion/Schedule	WLA	Basis for WLA
Impairment Information in the Draft 2014 Integrated Report					
Great Run	Aquatic Life	Benthic macroinvertebrates	2022	---	---
	Recreation	*E. coli*	Great Run Bacteria TMDL 10 March 2005	4.35E+10 cfu/year *E. coli*	126 cfu/100 mL *E. coli* --- 2.5 MGD
Information in the Chesapeake Bay TMDL					
Chesapeake Bay	Aquatic Life	Total Nitrogen	Chesapeake Bay TMDL 29 December 2010	30,456 lbs/yr TN	Edge of Stream (EOS) Loads
		Total Phosphorus		2,284 lbs/yr TP	
		Total Suspended Solids		76,139 lbs/yr TSS	

This facility discharges to an unnamed tributary to Great Run; located within the Chesapeake Bay watershed. The receiving stream has been addressed in the Chesapeake Bay TMDL, completed by the Environmental Protection Agency (EPA) on 29 December 2010. The TMDL addresses dissolved oxygen (D.O.), chlorophyll a and submerged aquatic vegetation (SAV) impairments in the main stem Chesapeake Bay and its tidal tributaries by establishing nonpoint source load allocations (LAs) and point-source waste load allocations (WLAs) for total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS) to meet applicable Virginia Water Quality Standards contained in 9VAC25-260-185. This facility is considered a Significant Chesapeake Bay wastewater discharge and has been assigned wasteload allocations as noted in Table 4 above.

Implementation of the Chesapeake Bay TDML is currently accomplished in accordance with the Commonwealth of Virginia's Phase I Watershed Implementation Plan (WIP); approved by EPA on 29 December 2010. The approved WIP recognizes that the TMDL nutrient WLAs for Significant Chesapeake Bay wastewater dischargers are set in two regulations: 1) the Water Quality Management Planning Regulation (9VAC25-720); and 2) the *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed of Virginia* (9VAC25-820). The WIP states that since TSS discharges from wastewater facilities represent an insignificant portion of the Bay's total sediment load, they may be considered aggregated and wastewater discharges with technology-based TSS limits are considered consistent with the TMDL.

40 CFR 122.44(d)(1)(vii)(B) requires permits to be written with effluent limits necessary to meet water quality standards and to be consistent with the assumptions and requirements of applicable WLAs. DEQ has provided coverage under the VPDES Nutrient General Permit (GP) for this facility under permit VAN020028. The requirements of the Nutrient GP currently in effect for this facility are consistent with the Chesapeake Bay TMDL. This individual permit includes TSS limits that are also consistent with the Chesapeake Bay TMDL and WIP. In addition, the individual permit addresses limitations for the protection of instream dissolved oxygen concentrations as detailed in Section 19 of this Fact Sheet. The proposed effluent limits within this individual permit are consistent with the Chesapeake Bay TMDL and will not cause an impairment or observed violation of the standards for D.O., chlorophyll a or SAV as required by 9VAC25-260-185.

The planning statement can be found in **Attachment 6.**

c. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, unnamed tributary to Great Run, is located within Section 4 of the Rappahannock River Basin and classified as Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32° C and maintain a pH of 6.0 – 9.0 standard units (S.U.).

The Freshwater Water Quality / Wasteload Allocation Analysis, located in **Attachment 7,** detail other water quality criteria applicable to the receiving stream. Some Water Quality Criteria are dependent on the pH, temperature and total hardness of the receiving stream and/or final effluent. These values were utilized while determining the aforementioned criterion for the following pollutants:

pH and Temperature for Ammonia Criteria

The fresh water, aquatic life Water Quality Criteria for ammonia is dependent on the instream pH and temperature. Since the effluent may have an impact on the instream values, the pH and temperature values of the effluent must also be considered when determining the ammonia criteria for the receiving stream. The 90th percentile pH and temperature values are utilized because they best represent the critical conditions of the receiving stream.

May 2011 to September 2015 effluent pH data is presented in **Attachment 8.** All reported data were utilized to calculate the 90th percentile for pH; which was found to be 8.2 S.U. Since effluent temperature data was not readily available, staff employed a default temperature value of 25° C for summer and an assumed temperature value of 15° C for winter.

Since there was no receiving stream data available, staff obtained ambient data collected within waterbody VAN-E02R which should adequately reflect those conditions found within the immediate receiving stream. A 90th percentile pH value of 7.6 S.U. and temperature values of 22.6° C and 13.0° C for summer and winter, respectively, were used during the calculations of the ammonia criteria (see **Attachment 9**).

Hardness Dependent Metals Criteria

The Water Quality Criteria for some metals are dependent on the receiving stream and/or effluent total hardness values (expressed as mg/L calcium carbonate).

Average hardness values of 115 mg/L $CaCO_3$ for the effluent, as reported on Form 2A, Part D of the reissuance application, and 44.6 mg/L $CaCO_3$ for the receiving stream as noted in **Attachment 9** were utilized to determine the metals criteria.

Bacteria Criteria

The Virginia Water Quality Standards at 9VAC25-260-170 A. state that the following criteria shall apply to protect primary recreational uses in surface waters:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]For a minimum of four weekly samples taken during any calendar month

d. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, unnamed tributary to Great Run, is located within Section 4 of the Rappahannock River Basin. This section has not been designated with a special standard.

e. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on 11 February 2016 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a three (3) mile radius of the discharge: dwarf Wedgemussel (*Alasmidonta heterodon*); northern long-eared bat (*Myotis septentrionalis*); upland Sandpiper (*Bartramia longicauda*); loggerhead Shrike (*Lanius ludovicianus*); Henslow's Sparrow (*Ammodramus henslowii*); green Floater (*Lasmigona subviridis*); and migrant loggerhead Shrike (*Lanius ludovicianus migrans*). The limits proposed within this draft permit are protective of the Virginia Water Quality Standards and protect the threatened and endangered species found near the discharge.

In addition, the Virginia Department of Conservation and Recreation was coordinated during this reissuance per the procedures as set forth in the 2007 Memorandum of Understanding (MOU) concerning Threatened and Endangered Species Screening for VPDES Permits. The purpose of this coordination is to obtain input from other agencies during the permitting process to ascertain potential adverse impacts to threatened and endangered species and/or their habitats.

Comments received from these agencies are noted in Section 26 of this Fact Sheet.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

It is staff's best professional judgement that the receiving stream be classified as Tier 1 based on the fact that: (1) previous reissuances classified the receiving stream as such, (2) there is no data available indicating that this classification be changed and (3) the noted downstream benthic impairment.

The proposed permit limits have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. In the case of ammonia evaluations, limits are needed if the 97th percentile of the thirty-day average effluent concentration value is greater than the chronic WLA. Effluent limitations are then calculated on the most limiting WLA, the required sampling frequency and statistical characteristics of the effluent data.

a. Effluent Screening

Effluent data obtained from the permit application and the May 2011 – September 2015 Discharge Monitoring Reports (DMRs) has been reviewed and determined to be suitable for evaluation. Please see **Attachment 10** for a summary of effluent data.

The following pollutants required a wasteload allocation analysis:

- ammonia, since this a treatment plant treating domestic sewage; and
- chromium, copper and zinc since these metals were found in the discharge above the quantification levels during the expanded effluent pollutant scan, as required in Form 2A, Part D.

b. Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o[Q_e + (f)(Q_s)] - [(C_s)(f)(Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- f = Decimal fraction of critical flow
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.

- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

As such, **Attachment 11** details the mixing analysis results for critical stream flows and the subsequent WLA derivations found in **Attachment 7** for those pollutants referenced in Section 17.a. above.

c. Effluent Limitations, Outfall 001 – Toxic Pollutants

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an instream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from publically owned treatment works (POTWs) and monthly average and daily maximum limitations be imposed for all other continuous non-POTW (e.g. industrial) discharges.

1) Ammonia as N

Staff reevaluated pH and temperature data for both the effluent and the waterbody. This data was utilized to determine ammonia water quality criteria, wasteload allocations (WLAs) and subsequent ammonia limitations (**Attachment 12**) of 1.0 mg/L and 1.3 mg/L for the monthly and weekly average, respectively. DEQ guidance suggests using a sole data point of 9.0 mg/L to ensure the evaluation adequately addresses the potential presence of ammonia within a given discharge containing treated domestic sewage.

The referenced limitations above are more stringent than the current 1.4 mg/L monthly average and 1.7 mg/L weekly average limits. However, it is staff's best professional judgement that these current limitations be carried forward with this reissuance. The premise is based on (1) the fact that there is no noted impairment for either the immediate receiving stream or downstream of the facility based on the current ammonia limits, (2) the facility historically, with the exception of late 2013/early 2014 has consistently reported ammonia below the laboratory quantification level and (3) the Environmental Protection Agency (EPA) finalized new, more stringent ammonia criteria in August 2013; possibly resulting in significant reductions in ammonia effluent limitations. Incorporation of these new criteria into the Virginia Water Quality Standards is forthcoming. This and many other facilities may be required to comply with these new criteria in future permit terms.

For these reasons, it is acceptable to carry the current limitations forward at this time and revisit the ammonia criteria during the next reissuance as the new criteria may be incorporated prior to the end of this term. If any facility upgrades would be warranted based on the calculated limits above and the new EPA criteria, it is more rational to complete one upgrade in lieu of several. The water quality of the receiving stream will be maintained during this permit term.

2) Total Residual Chlorine (TRC)

Chlorine is not utilized for disinfection at this facility; therefore, limitation derivation is not warranted.

3) Metals/Organics

A reasonable potential analysis was completed for chromium, copper and zinc since these metals were found above the laboratory quantification level during the expanded effluent testing as required in EPA Form 2A of the reissuance application. It was determined that no limits were warranted for any of these metals.

Please refer **Attachment 13** for the analyses.

d. Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), biochemical oxygen demand-5 day (BOD_5), total suspended solids (TSS), ammonia, and pH limitations are proposed.

Dissolved oxygen and BOD_5 limitations are based on the stream modeling conducted in June 1985 (**Attachment 14**) and are set to meet the water quality criteria for D.O. in the receiving stream.

It is staff's practice to equate the total suspended solids limits with the BOD_5 limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. Only concentration limits are now found in the individual VPDES permit when the facility installs nutrient removal technology. The basis for the concentration limits is 9VAC25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* which requires new or expanding discharges with design flows of ≥ 0.04 MGD to treat for TN and TP to either BNR (Biological Nutrient Removal) levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA (State of the Art) levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

This facility has also obtained coverage under 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020028. Total Nitrogen Annual Loads and Total Phosphorus Annual Loads from this facility are found in 9VAC25-720 – *Water Quality Management Plan Regulation* which sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e. those with design flows of ≥ 0.5 MGD above the fall line and > 0.1 MGD below the fall line.

Monitoring for nitrates + nitrites, total Kjeldahl nitrogen, total nitrogen and total phosphorus are included in this permit. The monitoring is needed to protect the Chesapeake Bay Water Quality Standards. Monitoring frequencies are set at the frequencies as set forth in 9VAC25-820. Annual average effluent limitations, as well as monthly and year to date calculations, for total nitrogen and total phosphorus are included in this individual permit. The annual averages are based on the technology installed as part of a Water Quality Improvement Fund (WQIF) grant. Please refer to **Attachment 15** for the project description and subsequent Certificate to Operate.

f. Effluent Limitations and Monitoring Summary

The effluent limitations are presented in Section 19. Limits were established for pH, biochemical oxygen demand-5 day (BOD_5), total suspended solids (TSS), dissolved oxygen (D.O.), ammonia as N, *E. coli*, total nitrogen and total phosphorus.

The facility will also be required to monitor and report flow, total Kjeldahl nitrogen (TKN), nitrate+nitrite and whole effluent toxicity.

The limit for total suspended solids is based on Best Professional Judgment.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and then a conversion factor of 3.785.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual; with the exception of BOD_5, TSS and ammonia. The monitoring frequencies for these parameters were reduced from the recommended 5D/W to 4D/W during the 2006 reissuance and were carried forward in 2011. Review of these effluent parameters during the past permit term indicates that the facility has maintained effluent quality with these reductions in place. Therefore, the reduced monitoring frequency for the aforementioned pollutants will be carried forward with this reissuance.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD_5 and TSS (or 65% for equivalent to secondary). The limits in this permit are water quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

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19. Effluent Limitations/Monitoring Requirements:

Design flow is 2.5 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1,3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
Biochemical Oxygen Demand (BOD_5)	3,5	10 mg/L 95 kg/day	15 mg/L 140 kg/day	NA	NA	4D/W [d.]	24H-C
Total Suspended Solids (TSS)	2	10 mg/L 95 kg/day	15 mg/L 140 kg/day	NA	NA	4D/W [d.]	24H-C
Dissolved Oxygen (DO)	3,5	NA	NA	6.5 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3	NL mg/L	NL mg/L	NA	NA	1/W	24H-C
Ammonia, as N	2,3	1.4 mg/L	1.7 mg/L	NA	NA	4D/W [d.]	24H-C
E. coli (Geometric Mean) [a.]	3	126 n/100mL	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	3,6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen [b.]	3,6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date [c.]	3,6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [c.]	3,6,7,8	4.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus	3	NL mg/L	NA	NA	NA	1/W	24H-C
Total Phosphorus – Year to Date [c.]	3,6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus – Calendar Year [c.]	3,6,7,8	0.3 mg/L	NA	NA	NA	1/YR	Calculated
Chronic Toxicity – *C. dubia*	3,9	NA	NA	NA	NL TU_c	1/YR	24H-C
Chronic Toxicity – *P. promelas*	3,9	NA	NA	NA	NL TU_c	1/YR	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Stream Model – **Attachment 14**
6. 9VAC25-40 (Nutrient Regulation)
7. 9VAC25-820 (Watershed General Permit)
8. Chesapeake Bay TMDL/WIP
9. Toxics Management Program Implementation Guidance (GM No. 00-2012)

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
4D/W = Four days per week.
1/W = Once per week.
1/M = Once every month.
1/YR = Once every calendar year.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15 minutes.

a. Samples shall be collected between 10:00 a.m. and 4:00 p.m.

b. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

c. See Section 20.a. for more information on the Nutrient Calculations.

d. See Section 21.j.

20. Other Permit Requirements:

a. Permit Section Part I.B. specifies quantification levels and compliance reporting instructions

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an instream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the nitrogen and phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b. Permit Section Part I.C. details the requirements for Whole Effluent Toxicity (WET) Program

Whole Effluent Toxicity (WET) refers to the aggregate toxic effect to aquatic organisms from all pollutants present within a facility's wastewater effluent. This program is one approach to comply with the Clean Water Act's prohibition of the discharge of toxic pollutants in toxic amounts. WET testing allows for the measurement of the wastewater's potential effects on specific test organism's ability to survive, grow and reproduce.

The VPDES Permit Regulation at 9VAC25-31-220.D.1.a-d. requires limitations in permits to provide for and ensure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Limitations must control all pollutants or pollutant parameters which the Board determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any Virginia water quality standard, including narrative criteria. The determination whether a discharge causes or contributes to an instream excursion above a narrative or numeric criteria shall utilize procedures which account for existing controls on sources of pollution, variability of the pollutant, species sensitivity and dilution of the effluent in the receiving stream. If it is determined that a reasonable potential exists to cause or contribute to an instream excursion of narrative criterion of the water quality standard, the permit must contain effluent limits for whole effluent toxicity. However, limits may not be necessary when it is demonstrated that chemical-specific limits are sufficient to attain and maintain applicable numeric and narrative water quality standards.

A WET Program is imposed for municipal facilities with a design rate >1.0 MGD, all facilities with an approved pretreatment program or required to develop a pretreatment program and/or those required by the Board based on effluent variability, compliance history, instream waste concentration (IWC), existing pollutant controls and/or receiving stream characteristics.

As referenced above, reasonable potential determinations must take into account the variability of the pollutant or pollutant parameter in the effluent, sensitivity of the species to toxicity testing and, as appropriate, the dilution of the effluent in the receiving stream. This warrants a sampling regime that rotates throughout a given calendar year; a quarterly schedule in order to obtain seasonal perspectives that encompass that potential variableness listed prior. This methodology coincides with the VPDES Permit Regulation requirements that facilities submit representative data that reflects the seasonal variation in the discharge with each permit application (9VAC25-31-100.K.4.g.). Therefore, it is staff's best professional judgement that a WET testing protocol be proposed with this permit action that requires a rotating, quarterly testing regime for each annual monitoring requirement. The schedule as set forth within Part I.C. of the permit will ensure that the discharge is monitored for whole effluent toxicity and demonstrates seasonal variations.

See **Attachment 16** for a summary of the past test results. It should be noted that the facility conducted several retests due to noted toxicity results. It was thought a change in polymer formulation at the plant may have explained the test failures. The facility ceased the use of this polymer, but failures were still noted. Further investigation indicated the possible presence of a fish pathogen. The retests conducted in December 2014, which included pretreatment with UV, verified this possibility. The permittee will continue to conduct WET testing during this term. **Attachment 17** documents the calculated compliance endpoints for this reissuance.

c. Permit Section Part I.D. details the requirements of a Pretreatment Program

The VPDES Permit Regulation at 9VAC25-31-730 through 900., and 40 CFR Part 403 requires publically owned treatment works (POTWs) with a design flow of > 5 MGD and receiving pollutants from Industrial Users (IUs) that have the potential to pass through or interfere with the operation of the POTW, or are otherwise subject to pretreatment standards, to develop a pretreatment program.

The Town of Warrenton WWTP is a POTW with a current design capacity of 2.5 MGD. Since this facility discharges greater than 40,000 gpd, pretreatment program conditions in accordance with DEQ guidance are included in Part I.D. of this VPDES permit to determine if a pretreatment program may be needed. Town staff completed an IU Survey as required during the last year of the previous permit cycle; therefore, the permittee will be required to submit written verification to DEQ-NRO indicating that the current survey is accurate and no potential significant industrial users discharge to this POTW. This will be due within 365 days of the permit effective date.

21. Other Special Conditions:

a. 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4 requires all POTWs and privately owned treatment works (PVOTWs) develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b. Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200.B.1 and B.2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c. O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; and VPDES Permit Regulation, 9VAC25-31-190.E. The permittee shall maintain a current Operations and Maintenance (O&M) Manual. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M Manual available to Department personnel for review upon request. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d. CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct (CTC) prior to commencing construction and to obtain a Certificate to Operate (CTO) prior to commencing operation of the treatment works.

e. Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq., the VPDES Permit Regulation at 9VAC25-31-200.C., and by the Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.

f. Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.

g. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

h. E3/E4. 9VAC25-40-70.B. authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

i. Nutrient Reopener. 9VAC25-40-70.A. authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390.A. authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

j. Effluent Monitoring Frequency. Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limits for which reduced frequencies were granted. If permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.

k. Collection System. 9VAC25-31-10 defines treatment works as any devices and systems used for the storage, treatment, recycling or reclamation of sewage or liquid industrial waste, or other waste or necessary to recycle or reuse water, including intercepting sewers, outfall sewers, sewage collection systems, individual systems, pumping, power and other equipment and their appurtenances. 9VAC25-31-190.E states that the permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. The permit reissuance application stated that the estimated inflow and infiltration (I&I) was 950,000 gallons per day; approaching 40% of the current design flow of the facility. The Town of Warrenton will be required to develop and fund a program that ensures regular maintenance and necessary rehabilitation of the sanitary sewer collection system; adequately conveying sanitary waste while concurrently addressing I&I.

l. Total Maximum Daily Load (TMDL) Reopener. Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan or other wasteload allocation prepared under section 303 of the Act.

22. Permit Section Part II.

Required by VPDES Regulation 9VAC25-31-190, Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Permit Section Part III.

Part III of the permit contains conditions and requirements for monitoring and distribution of biosolids. The VPDES Permit Regulation 9VAC25-31-420 through 729 establishes the standards for the use or disposal of biosolids; specifically land application and surface disposal, promulgated under 40 CFR Part 503. Standards consist of general requirements, pollutant limits, management practices and operational standards. Furthermore, VPA Regulation 9VAC25-32-303 through 685 sets forth the requirements pertaining to Class B biosolids. The permit sets forth the parameters to be monitored, monitoring frequencies, sampling types, the Biosolids Management Plan and reporting requirements.

24. Changes to the Permit from the Previously Issued Permit:

a. Special Conditions:

- The Water Quality Criteria Monitoring requirement was removed with this reissuance since the facility completed this task during the previous permit term. The subsequent analyses of the results indicated that there was no reasonable potential to cause or contribute impairment of water quality. The review memo can be found as **Attachment 18**; the entire analyses are on file in DEQ's Enterprise Content Management system.

- The Effluent Monitoring Frequency condition was included during this permit action since the reduced monitoring frequency was carried forward for BOD, TSS and ammonia. This reflects current agency protocol.

- Collection System condition was included with this reissuance based on the estimated inflow and infiltration currently experienced within the sanitary collection system.

b. Monitoring and Effluent Limitations:

- No changes during this reissuance.

c. Other:

- The Biosolids Monitoring requirements are now found in Part III as noted in Section 23 above.

25. Variances/Alternate Limits or Conditions:

As stated above, the facility was granted reduced monitoring frequencies for three parameters during the 2006 and 2011 reissuance and this will be continued with this reissuance.

26. Public Notice Information:

First Public Notice Date: 1 June 2016 Second Public Notice Date: 8 June 2016

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected and copied by contacting the: DEQ Northern Regional Office; 13901 Crown Court; Woodbridge, VA 22193; Telephone No. 703-583-3873, Douglas.Frasier@deq.virginia.gov. See **Attachment 19** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

27. Additional Comments:

Previous Board Action(s):	None.
Staff Comments:	None.
State/Federal Agency Comments:	No comments were received from the Virginia Department of Health. Virginia Department of Conservation and Recreation did not have any objections to this permit action. Please refer to **Attachment 20** for DCR's response.
Public Comments:	No comments were received during the public notice.
Owner Comments:	Town of Warrenton staff concurred with the proposed permit conditions and requirements as set forth.

Fact Sheet Attachments

Table of Contents

Town of Warrenton Wastewater Treatment Plant
VA0021172
2016 Reissuance

ATTACHMENT 1

Flow Frequency Determination

MEMORANDUM

Subject: Flow Frequency Determination for Town of Warrenton Wastewater Treatment Plant (VA0021172)

To: Town of Warrenton WWTP Permit File

From: Joan C. Crowther, DEQ-NRO

Date: March 18, 2010

This memorandum supercedes Paul E. Herman's Flow Frequency Determination memorandum dated December 3, 1998.

The Town of Warrenton WWTP discharges to an unnamed tributary of Great Run near Warrenton. Virginia. The stream flow is being determined by drainage comparison using the USGS flow monitoring station located on the Rappahannock River at Remington (#01664000). The statistical stream period being used is 1942 through 2003.

The high flow months are December through May. This analysis assumes there are no significant discharges, withdrawals, or springs influencing the flow of the Great Run, UT.

Year Rappahannock River at Remington (#10664000)	Drainage Area (square mile)	Harmean	HF30Q10	HF7Q10	HF1Q10	30Q5	30Q10	7Q10	1Q10	1Q30
2010 (CFS)	620	154	136	97	78	32	19	10	8.5	4.1
1998 (CFS)	620	159	159	109	89	32	20	11	8.7	
2010 (MGD)		99.5302	87.8968	62.6911	50.4114	20.6816	12.2797	6.463	5.49355	2.64983
1998 (MGD)		102.7617	102.7617	70.4467	57.5207	20.6816	12.926	7.1093	5.62281	0
Great Run, UT										
2010 (CFS)	1.24	0.308	0.272	0.194	0.156	0.064	0.038	0.02	0.017	0.0082
1998 (CFS)	1.24	0.318	0.318	0.218	0.178	0.064	0.04	0.022	0.0174	0
2010 (MGD)		0.1990604	0.1757936	0.1253822	0.1008228	0.0413632	0.0245594	0.012926	0.0109871	0.0052997
1998 (MGD)		0.2055234	0.2055234	0.1408934	0.1150414	0.0413632	0.025852	0.0142186	0.01124562	0

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Water Quality Assessments
629 East Main Street P.O. Box 10009 Richmond, Virginia 23219

SUBJECT: Flow Frequency Determination
Warrenton STP – #VA0021172

TO: Doug Stockman, NRO

FROM: Paul E. Herman, P.E., WQAP

DATE: December 3, 1998

COPIES: Ron Gregory, Charles Martin, Eugene Powell, File

This memo supercedes my March 11, 1993 memo to Raymond Jay concerning the subject VPDES permit.

The Warrenton STP discharges to an unnamed tributary of the Great Run near Warrenton, Virginia. Flow frequencies are required at this site for use by the permit writer in developing the VPDES permit.

The VDEQ conducted several flow measurements on the unnamed tributary to the Great Run from 1993 to 1997. The measurements were made upstream of the Warrenton STP outfall, at Warrenton, VA. The measurements were correlated with the same day daily mean values from the continuous record gage on the Rappahannock River at Remington, VA #01664000. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gage were plotted on the regression line and the associated flow frequencies at the measurement site/discharge point were determined from the graph. The data for the reference gage and the measurement site/discharge point are presented below:

Rappahannock River at Remington, VA (#01664000):

Drainage Area = 620 mi²

1Q10 = 8.7 cfs — **High Flow 1Q10 = 89 cfs**
7Q10 = 11 cfs — **High Flow 7Q10 = 109 cfs**
30Q5 = 32 cfs — **HM = 159 cfs**
LF 30Q10 = 20 cfs = 12.9 MGD — HF 30Q10 = 159 cfs = 103 MGD

UT to Great Run above Warrenton STP, at Warrenton, VA (#01662050):

Drainage Area = 1.24 mi²

.019 MGD – **1Q10 = 0.030 cfs** — **High Flow 1Q10 = 0.16 cfs** – 0.103 MGD
.022 MGD – **7Q10 = 0.034 cfs** — **High Flow 7Q10 = 0.18 cfs** – 0.116 MGD
.049 MGD – **30Q5 = 0.076 cfs** — **HM = 0.23 cfs** – 0.149 MGD
LF 30Q10 = 0.026 cfs — HF 30Q10 = 0.206 MGD

The high flow months are December through May. This analysis assumes there are no significant discharges, withdrawals, or springs influencing the flow in the UT to Great Run upstream of the measurement site.

If you have any questions concerning this analysis, please let me know.

Attachment 1

Amended 2004

ATTACHMENT 2

Stormwater General Permit Termination Memo and Correspondence

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

Preston Bryant
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

June 29, 2009

Mr. Bo Tucker
Town of Warrenton STP
731 Frost Ave.
Warrenton, VA 20186

Re: Termination of VPDES General Permit for Storm Water Discharges Associated with Industrial Activity – VAR051465

Dear Mr. Tucker:

This letter is in response to your inquiry concerning the termination of the VPDES General Permit for Storm Water Discharges Associated with Industrial Activity for the Town of Warrenton STP located in Warrenton, Virginia.

The Town of Warrenton STP requested termination of the above referenced VPDES permit due to the fact there is no significant impact on storm water from the facility and that the existing permit is unnecessary. A site visit was performed on June 11, 2009, to verify the information provided by the facility. Information provided was found to be accurate and representative of actual site conditions. The existing permit was terminated on June 29, 2009.

Please note that should a discharge arise in accordance with 9 VAC 25-31-100, Application for a Permit, the Town of Warrenton STP shall be responsible for complying with Virginia State Water Control Laws and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

Should you have any questions or need any additional information, please contact Susan Mackert at (703) 583-3853 or by email at susan.mackert@deq.virginia.gov.

Sincerely,

Bryant Thomas
Water Permits Manager

cc: File – VAR051465
Sharon Allen - Compliance Inspector

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHERN REGIONAL OFFICE

13901 Crown Court Woodbridge, VA 22193

SUBJECT: Termination of VAR051465

TO: File

FROM: Susan Mackert

DATE: June 29, 2009

COPIES: Bo Tucker – Warrenton STP

Northern Regional Office permitting staff was contacted by the aforementioned facility concerning permit termination. The facility indicated that there is no significant impact on storm water from the facility and that the existing permit is unnecessary. A site visit was performed on June 11, 2009 to verify information provided by the facility. The following are noted:

- The facility is a 2.5 MGD municipal wastewater treatment plant serving the Town of Warrenton.
- The facility currently has two outfall locations. Near the main entrance of the facility, A 12 inch drainage pipe collects overland flow from a grass covered hillside behind the main building (photo 1) and pipes under the entrance road and parking areas. Discharge from the pipe is into a rip-rap swale (photo 2) which transitions into sheet flow across grass before leaving the property (photo 3). At the rear of the facility, sheet flow from grass covered areas (photos 5 and 6) enters a rip rap lined swale (photo 4) before transitioning and leaving the site as sheet flow.
- The facility is currently undergoing an upgrade with construction activities taking place on site. All construction activities are covered under the Town of Warrenton's Erosion and Sediment Control Program. Construction activities are to be completed in October 2009.
- Construction activities are not changing the footprint of the plant. Outfall locations are not shifting and no additional outfalls are being added.

Based on observations from the site visit, storm water discharges from the facility are sheet flow in nature and not subject to VPDES permitting requirements. The existing VPDES General Permit for Storm Water Discharges Associated with Industrial Activity was terminated on June 29, 2009.

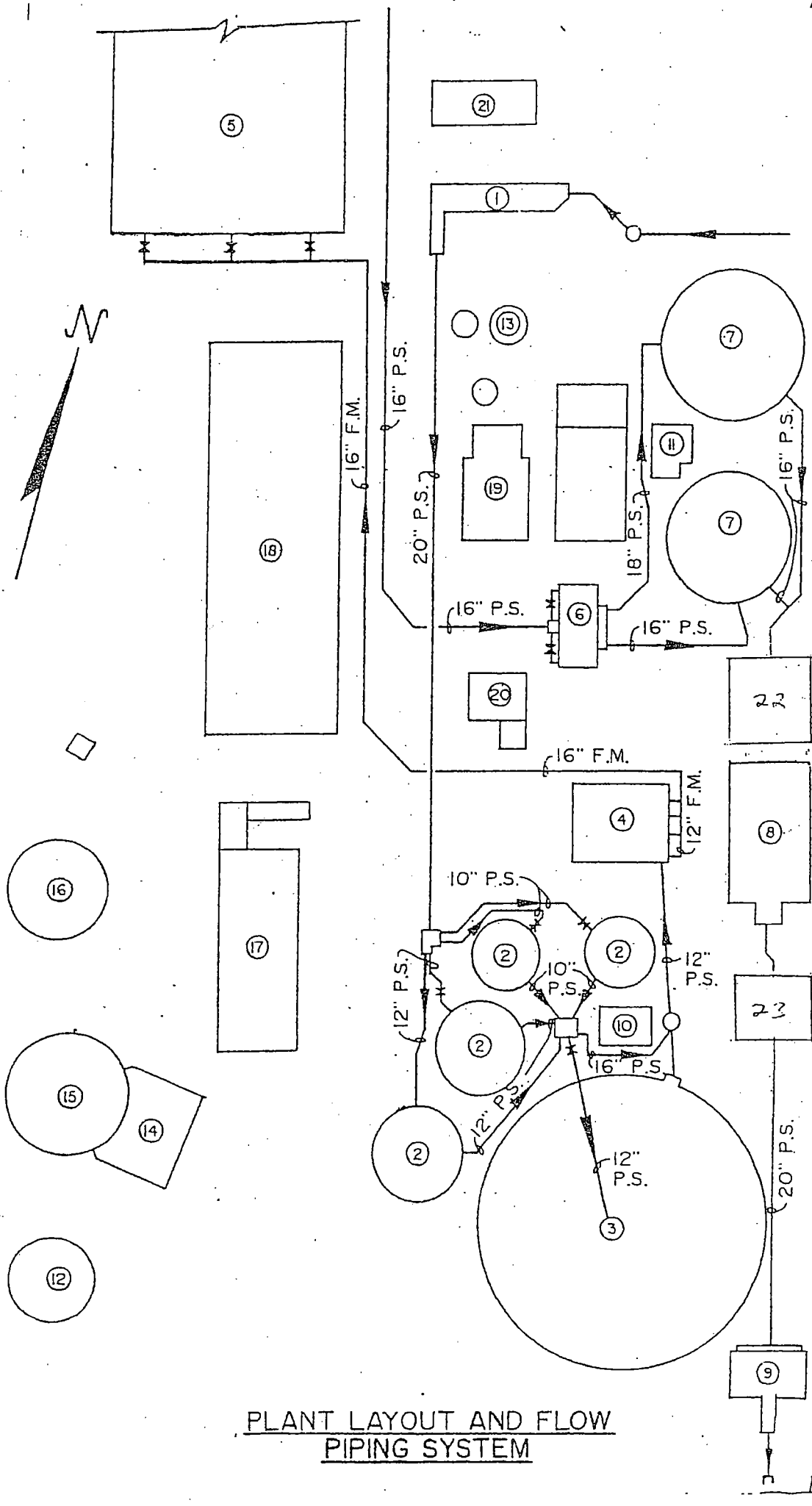
Please note that should a discharge arise in accordance with 9 VAC 25-31-100, Application for a Permit, the Town of Warrenton STP shall be responsible for complying with Virginia State Water Control Laws and Regulations. Additionally, coverage may be necessary at a later date should changes to regulations be implemented or site activities change.

ATTACHMENT 3

Facility Schematic/Diagram

Attachment to Part B, B.3.

1. HEADWORKS
2. PRIMARY CLARIFIER
3. TRICKLING FILTER
4. PLANT PUMP STATION #1
5. RBC UNITS
6. FLASH MIXER & FLOCCULATORS
7. SECONDARY CLARIFIER
8. Ozonite FILTERS
9. POST AERATION TANK
10. PRIMARY SLUDGE PUMP STATION
11. SECONDARY SLUDGE PUMP STATION
12. SLUDGE THICKENER NO.
13. SLUDGE THICKENER NO.
14. DIGESTER CONTROL BUILDING
15. PRIMARY DIGESTER
16. SECONDARY DIGESTER
17. CONTROL BUILDING
18. COVERED SLUDGE DRYING BEDS
19. CHEMICAL FEED BUILDING
20. DECHLORINATION BUILDING
21. BLOWER BUILDING
22. pump STATION #2
23. UV VAULT



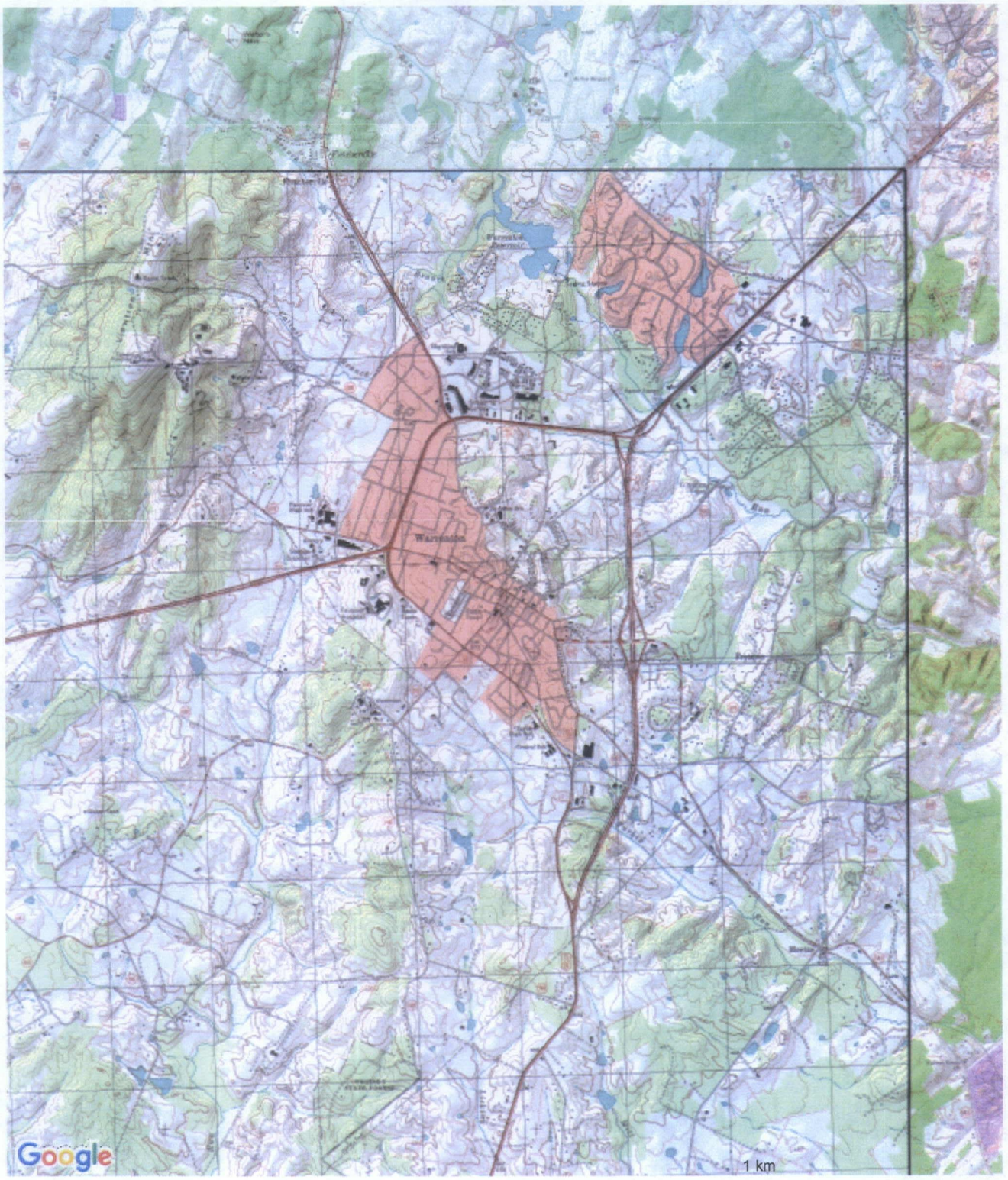
PLANT LAYOUT AND FLOW PIPING SYSTEM

FIGURE I-1

ATTACHMENT 4

Topographic Map

Warrenton Topo Map in Fauquier County Virginia



Print this map

Map provided by TopoZone.com

ATTACHMENT 5

DEQ-NRO Inspection Report

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193

(703) 583-3800 Fax (703) 583-3821

www.deq.virginia.gov

David K. Paylor
Director

Molly Joseph Ward
Secretary of Natural Resources

Thomas A. Faha
Regional Director

December 16, 2015

Mr. Edward B. Tucker
Director of Public Works
Town of Warrenton
P.O. Box 341
Warrenton, VA 20188

Re: **Town of Warrenton WWTP – Permit VA0021172 Technical and Laboratory Inspection**

Dear Mr. Tucker,

Attached is a copy of the Inspection Report generated while conducting a Facility Technical Inspection at the Town of Warrenton – Wastewater Treatment Plant (WWTP) on November 5, 2015. This letter is not intended as a case decision under the Virginia Administrative Process Act, Va. Code § 2.2-4000 *et seq.* (APA). The compliance inspection staff would like to thank Mr. Jeff Iannarelli and Allen Chichester for their time and assistance during the inspection.

Please note the requirements and recommendations addressed in the technical summary, and submit in writing, a progress report to this office by January 16, 2016. Your response may be sent either via the US Postal Service or electronically, via E-mail. If you choose to send your response electronically, we recommend sending it as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm the facility is in compliance with permit requirements.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office at (703) 583-3801 or by E-mail at Lisa.Janovsky@deq.virginia.gov.

Lisa Janovsky
Environmental Specialist II

cc: Permit/DMR File;
Water Compliance Manager

DEQ
WASTEWATER FACILITY INSPECTION REPORT
PREFACE

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
VA0021172	**04/27/2011**		**04/26/2016**

Facility Name	Address	Telephone Number
Town of Warrenton Wastewater Treatment Plant (WWTP)	**731 Frost Avenue Warrenton, VA 20188**	**540-347-1104**
Owner Name	Address	Telephone Number
Town of Warrenton	**P.O. Box 3419 Warrenton, VA 20186**	**540-347-2500**
Responsible Official	Title	Telephone Number
Edward B. Tucker, Jr.	**Utilities Director**	**540-347-1858**
Responsible Operator	Operator Cert. Class/number	Telephone Number
Allen G. Chichester	**Class I / 1965000608**	**540-347-1104**

TYPE OF FACILITY:

DOMESTIC				**INDUSTRIAL**			
Federal		Major	X	Major		Primary	
Non-federal	X	Minor		Minor		Secondary	

INFLUENT CHARACTERISTICS:	DESIGN:
Flow	**2.5 MGD**
Population Served	**>10,000**
Connections Served	**4,735**
TSS (Oct 2015)	**11 mg/L**
pH (Oct 2015)	**7.2-7.8 S.U.**

EFFLUENT LIMITS: mg/L unless otherwise noted. **WWTP OUTFALL 001 – 0.01 MGD**

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
Flow	**NL**	**NA**	**NL**	**pH (S.U.)**	**6.0**		**9.0**
BOD_5		**10**	**15**	**TSS**		**10**	**15**
D.O.	**6.5**			**Ammonia as N**		**1.4**	**1.7**
E.coli (n/100 mLs)		**126**		**TKN**	**NL**	**NA**	**NL**
Total Nitrogen – Calendar year		**4.0**		**Total Phosphorus – Calendar Year**		**0.3**	

	Receiving Stream	**UT to Great Run**	

	Basin	**Rappahannock River**
	Discharge Point (LONG)	**77° 48' 57" W**
	Discharge Point (LAT)	**38° 43' 00" N**

Virginia Department of Environmental Quality

FOCUSED CEI TECH/LAB INSPECTION REPORT

FACILITY NAME: Town of Warrenton WWTP		**INSPECTION DATE:**	November 5, 2015
		INSPECTOR:	Lisa Janovsky
PERMIT No.: VA0021172		**REPORT DATE:**	December 16, 2015
TYPE OF FACILITY: ☑ Municipal ☑ Major; ☐ Industrial ☐ Minor; ☐ Federal ☐ Small Minor; ☐ HP ☐ LP		**TIME OF INSPECTION:**	9:45am – 1:30pm
		TOTAL TIME SPENT	35 hours
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?** ☑ Yes ☐ No	
REVIEWED BY / Date: Earl L. Stafford 12/9/15			
PRESENT DURING INSPECTION: Amy Dooley – DEQ Allen Chichester & Jeff Ianarelli – Town of Warrenton			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments: **Last CTO was issued November 13, 2009 for deep bed de-nitrification filters and associated structures**	☐ Yes ☑ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments:	☑ Yes ☐ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments:	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments:	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments: **Operator training is conducted in the lab/office and the operators take classes either in person or online to fulfill their license requirements**	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments:	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments: **A portion of the influent bypasses the trickling filter during high flows**	☑ Yes ☐ No
8. Have there been any bypassing or overflows since the last inspection? Comments:	☐ Yes ☑ No
9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments: **The generator is run once per week with no load and once per month under full load.**	☑ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No

VA DEQ Focused CEI Tech/Lab Inspection Report

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TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? Comments:	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☑ Yes ☐ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No
14. Which of the following records does the plant maintain? ☑ Operational logs ☑ Instrument maintenance & calibration ☑ Mechanical equipment maintenance ☐ Industrial Waste Contribution (Municipal facilities) Comments:	
15. What does the operational log contain? ☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☑ Process adjustments ☑ Control calculations ☐ Other (specify) Comments:	
16. What do the mechanical equipment records contain? ☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules ☐ Spare parts inventory ☑ Equipment/parts suppliers ☐ Other (specify) Comments:	
17. What do the industrial waste contribution records contain (Municipal only)? ☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types ☐ Other (specify) Comments:	
18. Which of the following records are kept at the plant and available to personnel? ☑ Equipment maintenance records ☑ Operational log ☑ Industrial contributor records ☑ Instrumentation records ☑ Sampling and testing records Comments:	
19. List records not normally available to plant personnel and their location: Comments: NA	
20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

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UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping	X		
Flow Measurement (Influent)	X		
Screening/Comminution	X	1	*Aquaguard Fine Screen – Runs automatically on for 2 minutes, off for 15 minutes* *The dumpster is emptied approximately 2 times per week.* *Rags are removed daily* ***The dumpster was leaking (photo 1)***
Grit Removal	X		*Accumulates 4 cubic yards/week*
Primary Sedimentation	X		*Some algae build-up on the weirs*
Trickling Filter	X		*Large amount of filter flies. Maintained weakly – greased and cleaned*
Rotating Biological Contactor	X		*21 Units total, 19 in service at time of inspection*
Biological Nutrient Removal	X		
Secondary Sedimentation	X		*Some algae build-up on the weirs*
Flocculation	X		*Aluminum chlorohydrate added to aid in coagulation*
Ultraviolet Disinfection	X		*2 UV banks total*
Post Aeration	X		
Flow Measurement (Effluent)	X		
Plant Outfall	X		
Sludge Pumping	X		
Gravity Thickening	X		
Anaerobic Digestion	X		
Sludge Press	X		
Drying Beds	X		
Land Application (Sludge)	X		

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* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- DEQ arrived onsite and met Allen Chichester and Jeff Ianarelli from the Town of Warrenton.
- DEQ observed the laboratory and noted the following items:
  - The NIST certification for all meters and the were expired and dated 12/22/2012. The operators are in the process of ordering a NIST certified thermometer in order to correct this issue.
  - Mr. Chichester or Mr. Ianarelli did not have an IDC available.
  - **See Request for Corrective Action**
- Screening – The dumpster for rag removal was leaking (Photo 1). This should be fixed so there is minimal screenings/influent on the ground. Rags at the headworks are removed daily. **See Request for Corrective Action.**
- Grit Removal – The plant accumulates approximately 4 cubic yards of grit per week. There are 2 channels, where each channel alternates every 15 minutes.
- Trickling filter dosing tank and trickling filter – This filter is designed so some influent bypasses the filter when high flows are occurring. There were a large amount of filter flies coming from the trickling filter upon opening the doors (Photo 7).
- Rotating Biological Contactors (RBC) - There are 21 total RBC units, 19 of which were in service. The units are alternated on a monthly basis (Photo 6).
- Primary and Secondary clarifiers – there was some algae observed in the weirs. No other issues noted (Photos 2 & 3).
- Denitrification filters – All 4 filters were online. One filter is backwashed every 8 hours. No issues noted (Photo 4).
- UV disinfection – There are 2 total channels with 12 bulbs in each bank. Each bank can handle 3.5-4.0 MGD flow. The intensity meters were working and showed an intensity value of 94%. Operators clean the bulbs once per month. There were no maintainece records available for the UV system – DEQ informed them that they should keep a log for all maintenance activities and cleanings at the UV system (Photo 8).
- There was a groundhog hole near the outfall. Additionally, there appeared to be erosion occurring near the edge of the property (Photos 5 & 11). **See Request for Corrective Action**
- The effluent at the outfall was clear and odor free. No problems observed. (Photo 12).

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EFFLUENT FIELD DATA:

Flow	2.24 MGD	**Dissolved Oxygen**	8.6 mg/L	**TRC (Contact Tank)**	mg/L
pH	7.98 S.U.	**Temperature**	23.0 °C	**TRC (Final Effluent)**	mg/L

Was a Sampling Inspection conducted? ☐ Yes (see Sampling Inspection Report) ☐ No

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: ☑ Shore based ☐ Submerged Diffuser? ☐ Yes ☐ No

2. Are the outfall and supporting structures in good condition? ☑ Yes ☐ No

3. Final Effluent (evidence of following problems): ☐ Sludge bar ☐ Grease
   ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen

4. Is there a visible effluent plume in the receiving stream? ☐ Yes ☑ No

5. Receiving stream: ☑ No observed problems ☐ Indication of problems (explain below)

Comments: **Outfall and effluent was clear and odor free. No problems observed.**

REQUEST for CORRECTIVE ACTION:

1. Permit VA0021172 part 1.C.2. Operation and Maintenance (O&M) Manual Requirement states:
The permittee shall maintain a current Operations and Maintenance (O&M) Manual for the treatment works that is in accordance with Virginia Pollutant Discharge Elimination System Regulations, 9VAC25-31 and (for sewage treatment plants) Sewage Collection and Treatment Regulations, 9VAC25-790. The O&M Manual and subsequent revisions shall include the manual effective date and meet Part II.K.2 and Part II.K.4 Signatory Requirements of the permit. Any changes in the practices and procedures followed by the permittee shall be documented in the O&M Manual within 90 days of the effective date of the changes. The permittee shall operate the treatment works in accordance with the O&M Manual and shall make the O&M manual available to Department personnel for review during facility inspections. Within 30 days of a request by DEQ, the current O&M Manual shall be submitted to the DEQ-NRO for review and approval. The O&M Manual shall detail the practices and procedures which will be followed to ensure compliance with the requirements of this permit. This manual shall include, but not necessarily be limited to, the following items, as appropriate:

   a. Permitted outfall locations and techniques to be employed in the collection, preservation, and analysis of effluent, storm water and sludge samples;
   b. Procedures for measuring and recording the duration and volume of treated wastewater discharged;
   c. Discussion of Best Management Practices, if applicable;
   d. Procedures for handling, storing, and disposing of all wastes, fluids, and pollutants that will prevent these materials from reaching state waters. List type and quantity of wastes, fluids, and pollutants (e.g. chemicals) stored at this facility;
   e. Discussion of treatment works design, treatment works operation, routine preventative maintenance of units within the treatment works, critical spare parts inventory and record keeping;
   f. Plan for the management and/or disposal of waste solids and residues;
   g. Hours of operation and staffing requirements for the plant to ensure effective operation of the treatment works and maintain permit compliance;
   h. List of facility, local and state emergency contacts; and
   i. Procedures for reporting and responding to any spills/overflows/ treatment works upsets."

   Observations: **The following observations were made:**
   - **Algae growth was observed on the weirs of the primary and secondary clarifiers**
   - **The grit/rag dumpster at the headworks was leaking and influent was getting on the ground**
   - **There was a groundhog hole near the outfall and erosion near the edge of the property.**
   - **Hydraulic overloading of plant such that process treatment bypass occurs. Is the result of I&I in the collection system?**

Maintain the facility grounds in accordance with your O&M manual to prevent the above items. Provide an explanation to DEQ as to how these issues will be addressed.

NOTES and COMMENTS:

- DEQ recommends keeping a maintenance log of all cleanings and bulb replacements completed at the UV units.

VA DEQ Focused CEI Tech/Lab Inspection Report

Photo 1: Dumpster Leaking

Photo 2: Primary Clarifier – Some algae growth

Photo 3: Secondary Clarifier

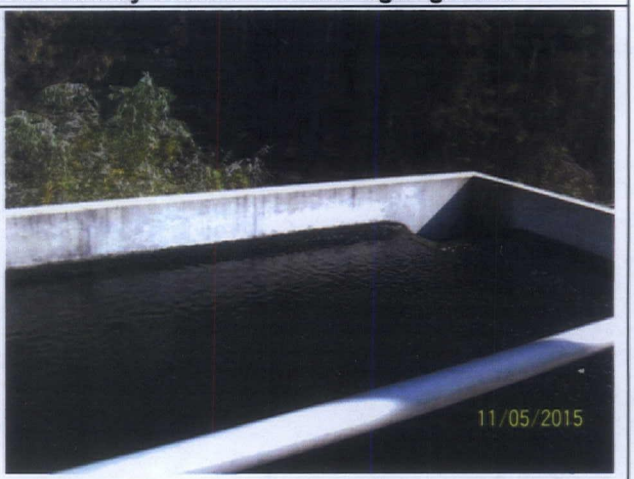

Photo 4: Denitrification Filter

Photo 5: Degradation around edge of property

Photo 6: Rotating Biological Contactors

Photos by: Amy Dooley

Layout by: Lisa Janovsky

VA0021172

November 5, 2015

Photo 7: Trickling Filter

Photo 8: UV Channels

Photo 9: Post Aeration

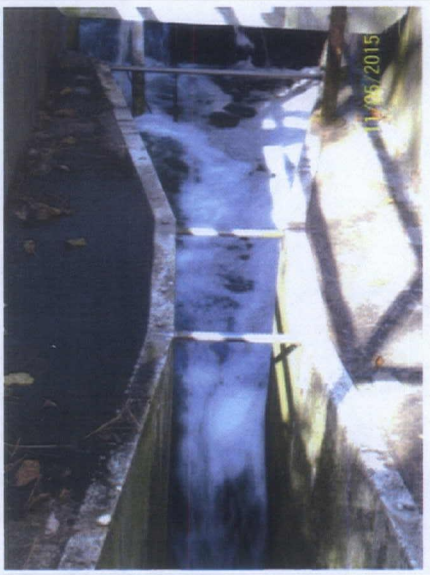

Photo 10: Weir/Sample point

Photo 11: Groundhog Hole near outfall

Photo 12: Outfall 001

Photos by: Amy Dooley

Layout by: Lisa Janovsky

VA0021172

November 5, 2015

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
LABORATORY INSPECTION REPORT

09/2014

PERMIT #:	INSPECTION DATE:	PREVIOUS INSP. DATE:	PREVIOUS EVALUATION:	TIME SPENT:
VA0021172	11/05/2015	11/4/2010	Minor Deficiencies	2hr

NAME/ADDRESS OF FACILITY:	FACILITY CLASS:	FACILITY TYPE:	UNANNOUNCED INSPECTION?
Town Of Warrenton WWTP 731 Frost Ave. Warrenton, VA 20188	(X) MAJOR ( ) MINOR ( ) MINOR (Small) ( ) VPA	(X) MUNICIPAL ( ) INDUSTRIAL ( ) FEDERAL	(X) YES ( ) NO **FFY-SCHEDULED INSPECTION?** (X) YES ( ) NO

INSPECTOR(S): Lisa Janovsky	REVIEWER(S):	PRESENT AT INSPECTION:
	Edward L. Stat	Amy Dooley – DEQ Allen Chichester & Jeff Ianarelli – Town of Warrenton

LABORATORY EVALUATION	DEFICIENCIES? Yes	No
LABORATORY RECORDS		X
GENERAL SAMPLING AND ANALYSIS	X	
pH PROCEDURE	X	
DO PROCEDURE	X	

VELAP CERTIFICATION (on site Environmental Laboratory)	Yes	No
Does the laboratory have VELAP certification (interim or final)?		X
– Document the laboratory's VELAP laboratory number:	N/A	
– Document the effective date of the VELAP certification:	N/A	
– Document the expiration date of the VELAP certification:	N/A	
– List the certified parameters:	N/A	

VELAP ACCREDITATION (Commercial Environmental Laboratory)	Yes	No
IS A VELAP ACCREDITED LAB USED FOR OTHER PERMIT REQUIRED ANALYSES? VELAP#, LAB NAME, ADDRESS and LIST PARAMETERS:		X
VELAP # 460019 — LAB NAME: Environmental Systems Service, Ltd. 218 N. Main St. Culpeper, VA 22701 — PARAMETERS: BOD_5, TSS, Ammonia, E.coli, Total P, TKN, Nitrate/Nitrite		
IF PERMIT REQUIRED SAMPLE ANALYSIS IS PERFORMED AT ANOTHER LOCATION, ARE SHIPPING PROCEDURES ADEQUATE?	X	

COPIES: (X) DEQ - RO; (X) Owner, ( ) Other:

PERMIT #: VA0021172

LABORATORY RECORDS SECTION

LABORATORY RECORDS INCLUDE THE FOLLOWING:

X	SAMPLING DATE	X	ANALYSIS DATE	X	CONT MONITORING CHART
X	SAMPLING TIME	X	ANALYSIS TIME	X	INSTRUMENT CALIBRATION
X	SAMPLE LOCATION	X	TEST METHOD	X	INSTRUMENT MAINTENANCE
				X	CERTIFICATE OF ANALYSIS

WRITTEN INSTRUCTIONS INCLUDE THE FOLLOWING:

X	SAMPLING SCHEDULES	X	CALCULATIONS	X	ANALYSIS PROCEDURES

	YES	NO	N/A
DO ALL ANALYSTS INITIAL THEIR WORK?	X		
DO BENCH SHEETS (or LOG BOOK) INCLUDE ALL INFORMATION NECESSARY TO DETERMINE RESULTS?	X		
IS THE DMR COMPLETE AND CORRECT? LIST MONTH(S) REVIEWED: **March 2015, October 2015, December 2014, June 2013**	X		
ARE ALL MONITORING VALUES REQUIRED BY THE PERMIT REPORTED?	X		
DOES CHAIN OF CUSTODY DOCUMENT PROPER SAMPLE PRESERVATION WAS MET?	X		
WHEN THE CERTIFICATE OF ANALYSIS CONTAINS FLAGGED DATA IS THE 'FLAG' REPORTED ON THE DMR?	X		

GENERAL SAMPLING AND ANALYSIS SECTION

	YES	NO	N/A
ARE SAMPLE LOCATIONS ACCORDING TO PERMIT REQUIREMENTS?	X		
ARE PERMIT REQUIRED SAMPLE COLLECTION PROCEDURES APPROPRIATE?	X		
ARE EFFLUENT SAMPLES REPRESENTATIVE OF THE MONITORED ACTIVITY?	X		
ARE PERMIT REQUIRED COMPOSITE SAMPLES FLOW PROPORTIONAL? **NOTE:** Equal volume composite aliquots are acceptable ***if the measured flow for each aliquot is within ± 10% of the monitoring period's average flow***. Some permits specify how the composite is to be taken (e.g., 5G/8HC).	X		
IS COLLECTION SAMPLE EQUIPMENT ADEQUATE?	X		
IS FLOW MEASUREMENT ACCORDING TO PERMIT REQUIREMENTS?	X		

DEPARTMENT OF ENVIRONMENTAL QUALITY – WATER DIVISION
LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME:	Town of Warrenton WWTP	Permit #:	VA0021172	INSPECTION DATE:	11/05/2015
LABORATORY EVALUATION			No required actions at this time		
		X	**REQUIRED CORRECTIVE ACTION(s) IDENTIFIED**		

SUMMARY of REQUEST FOR CORRECTIVE ACTION

Lab Records

Laboratory Records section deficiency and required action:

1. **None**

General Sampling and Analysis

General Sampling and Analysis section deficiency and required action:

Permit VA0021172 part II.A. Monitoring states:

1. **Samples and measurements required by this permit shall be taken at the permit designated or approved location and be representative of the monitored activity.**
   a. **Monitoring shall be conducted according to procedures approved under Title 40 Code of Federal Regulations Part 136 or alternative methods approved by the U.S. Environmental Protection Agency, unless other procedures have been specified in this pernit.**
   b. **The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will insure accuracy of measurements.**
   c. **Samples taken shall be analyzed in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.**

Observations:

- The Initial Demonstration of Capability was not completed for operators for the following parameters: pH and Dissolved Oxygen

Provide an explanation to DEQ and timeline as to when these items will be completed.

pH and D.O. Analysis

Deficiency and required action:

1. **The last NIST annual thermometer check for DO and pH and was 12/22/2012**
2. **The operator IDC's for pH and D.O. have not been completed to date**

OTHER – Comments or Observations

- **None**

ANALYST:	Jeff Iannarelli	VPDES NO	VA0021172

Meter: **Fisher Accumet XL 25**

Parameter: Hydrogen Ion (pH)
Method: Electrometric
3/2015

METHOD OF ANALYSIS:

X	21st Edition of Standard Methods (SM 21) – 4500-H^+ B-2000 (SM 21 pH)
	22nd Edition of Standard Methods (SM 22), or Online Editions of Standard Methods – 4500-H^+ B-2011 (SM 22 pH)

	pH is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE**: Analyze 4 samples of known pH; you may use an external source of buffers or other known standards (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.2 SU of the known concentration of the sample or within "Acceptable Range" specified by the PT provider. [SM 1020 B.1] **NOTE: The same pH buffer [values] used for calibration of the instrument can be used as LCS if from a different source or different lot.**		X
2)	**IF** a replicate sample is analyzed is there a written procedure for which result will be reported on DMR (Sample or Replicate) and is this procedure being followed? [DEQ – based on EPA Good Laboratory Practices Standards]	X	
3)	Is a Laboratory Control Sample (LCS) tested at least annually and are results within acceptance criteria? [SM 21 B.2 or SM 22 1020 B.3.] **NOTE:** LCS should be a purchased Proficiency Test (PT) sample or a different buffer other than ones used for calibration of the meter [with a ±0.2 SU acceptance range or within "Acceptable Range" specified by the PT provider].. **NOTE: The same pH buffer [values] used for calibration of the instrument can be used as LCS if from a different source or different lot.**	X	
4)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [SM 21 pH or SM 22 pH 2.b./c. and 5.b.]	X	
5)	Is electrode storage solution in accordance with manufacturer's instructions? [SM 21 pH or SM 22 pH 4.a. and Mfr.]	X	
6)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [SM 21 pH or SM 22 pH 4.a.] **NOTE**: Start with Buffer 7 unless manufacturer's instructions state otherwise. **[NOTE:** If meter is not capable of 3 buffer calibration use 2 buffers bracketing the expected sample pH and then measure a 3rd buffer (the measurement value recorded must be ±0.1 SU), and then reread and record value of buffer 7 to ensure ±0.1 SU.]	X	
7)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Verification measurement should be within +/- 0.1 SU. [SM 21 1020 B 10.c. or SM 22 1020 B 11.c.]	X	
8)	Is calibration verification measurement repeated with every 10 samples and at the end of a series of samples? Verification measurement should be within +/- 0.1 SU. [SM 21 pH or SM 22 pH 4020 B 2.b.] **NOTE:** Not applicable if pH meter is calibrated before taking any measurement (e.g., if operator monitors daily pH at more than one facility and calibrates before each measurement).	X	
9)	Do the buffer solutions appear to be free of contamination or growths? [SM 21 pH or SM 22 pH 3.a.]	X	
10)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [SM 21 pH or SM 22 pH 3.a.]	X	

11)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	X	
12)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	In-situ	
13)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [SM 21 pH or SM 22 pH 4.a and 4.b]	X	
14)	Is the sample stirred gently at a constant speed during measurement? [SM 21 pH or SM 22 pH 4.b.]	X	
15)	Does the meter hold a steady reading after reaching equilibrium? [4.b.]	X	

PROBLEMS:

An initial Demonstration of operator Capability (IDC) must be completed for all analysts for the Accument XL 25 pH meter. This is a repeat deficiency from the inspection report dated December 6, 2010.

COMMENTS: **pH taken by Jeff Ianarelli at 12:45pm was 7.98 mg/L @ 23.0°C**

ANALYST:	Jeff Ianarelli	VPDES NO	VA0021172

Meter: YSI 58

Parameter: Dissolved Oxygen
Method: Membrane Electrode
11/2014

METHOD OF ANALYSIS:

X	21st Edition of Standard Methods (SM 21) – 4500-O G-2001 (SM 21 DO)
	22nd of Standard Methods, or Online Editions of Standard Methods (SM 22) – 4500-O G-2011 (SM 22 DO)

	Dissolved Oxygen (D.O.) is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	*Y*	*N*
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE**: Analyze 4 samples of air-saturated water. Recovery for each of the 4 samples must be +/- 4% of the calculated oxygen saturation for the altitude/barometric pressure and temperature of the samples. {Alternatively analyze 4 samples of water of known concentration (verified by iodometric titration procedure SM 21 or SM 22 4500-O C). Instrument measurements must agree within +/-0.1 mg/L of verified concentration.} [SM 21 or SM 22 1020 B.1 and 4020 B.1]		X
2)	Are calibration results (mg/L) within ± 4% of the barometric (or altitude) corrected oxygen saturated water value? [SM 21 B.2 or SM 22 1020 B.2.]	X	
3)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [SM 21 DO or SM 22 B 3.]	**In Situ**	
4)	Are meter and electrode operable and providing consistent readings? [SM 21 DO G 2. or SM 22 DO G 2.]	X	
5)	Is membrane in good condition without trapped air bubbles? **NOTE: No air bubbles ≥ 1/8 inch (total area of all bubbles).** [SM 21 DO G 3.b. or SM 22 DO G 3.b.]	X	
6)	Is correct filling solution used in electrode? [Mfr.]	X	
7	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	X	
8)	Is meter calibrated before use or at least daily? [Mfr. & SM 21 1020 B 10.a. or SM 22 1020 B 11.a]	X	
9)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	X	
10)	Is sample stirred during analysis (or is there sufficient flow across probe's membrane surface)? [SM 21 DO or SM 22 DO G 3.b. and Mfr.]	X	
11)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	X	
12)	Is meter stabilized before reading D.O.? [Mfr.]	X	
13)	Is electrode stored according to manufacturer's instructions? [Mfr.]	X	

PROBLEMS:

An initial Demonstration of operator Capability (IDC) must be completed for all analysts for the YSI 58 D.O. meter.

COMMENTS:

- D.O. taken @ 12:45pm by Jeff Ianarelli : 8.6 mg/L @ 22.2°C

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET
11/2014

FACILITY NAME:	Town of Warrenton WWTP			PERMIT NO:		VA0021172		DATE:	November 5, 2015				
EQUIPMENT	Preservation Range	In Range?		Inspector Reading	Checked & Logged Daily?		Correct Increment?		ANNUAL THERMOMETER VERIFICATION				
									Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?			Yes/No NO	
		Yes	No	°C	Yes	No	Yes	No	DATE CHECKED	MARKED Yes	MARKED No	OFFSET VALUE1 (Correction) °C	INSPECT TEMP °C
pH METER	± 1° C	X							12/22/2012	X		0	23.0
D.O. METER	± 1° C	X							12/22/2012	X		-0.5	22.2

PROBLEMS:

- **The NIST certificate is out of date.**

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION

1 Offset Value tolerances (reference **NIST 105-6**): Sampling Refrigerator and Auto Sampler, pH and D.O. meters must be within ±2°C (2 times tolerance value). Thermometers measuring Outfall permit compliance must be within ±1.0°C (2 times tolerance value).

SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET

Revised 02/2015 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	Town of Warrenton WWTP	VPDES NO	VA0021172	DATE:	12/8/2015

HOLDING TIMES *[Note: Collection period (for composites) and Sample Collection time (end of collection period) must be recorded on the COC.]*						**SAMPLE CONTAINER**				**PRESERVATION** *[Note: Preservation is to occur within 15 minutes of the end of the collection period.]*				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
pH	15 MIN.	X		X		X		X		Within 15 minutes				
DISSOLVED O_2	15 MIN	X		X		In-situ		NA		Within 15 minutes				
TEMPERATURE	IMMERSION STAB.	X		X		In-situ		NA		N/A - Immediately				
TKN	28 Days	X		X		X		X		DECHLOR ≤6° C+H_2SO_4 pH<2				
BOD_5 & $CBOD_5$	48 HOURS									≤6° C	X		X	
FECAL COLIFORM / *E. coli* / *Enterococci*	8 HRS									<10° C+0.008% $Na_2S_2O_3$	X		X	
TSS	7 DAYS									≤6° C	X		X	
AMMONIA	28 DAYS									DECHLOR ≤6° C+H_2SO_4 pH<2t	X		X	

PROBLEMS: **None**

Holding Times and Preservation References (VELAP except for Field Tests)

ATTACHMENT 6

Planning Statement

To:	Douglas Frasier
From:	Rebecca Shoemaker
Date:	23 November 2015
Subject:	Planning Statement for the Town of Warrenton Wastewater Treatment Plant
Permit Number:	VA0021172

Information for Outfall 001:

Discharge Type:	major, municipal
Discharge Flow:	2.5 MGD
Receiving Stream:	Great Run, UT
Latitude / Longitude:	38° 42' 58.5" / 77° 48' 55.5"
Rivermile:	0.26
Streamcode:	3-XHS
Waterbody:	VAN-E02R
Water Quality Standards:	Class III, Section 4, no special standards
Drainage Area:	1.24 square miles

1. Please provide water quality monitoring information for the receiving stream segment. If there is not monitoring information for the receiving stream segment, please provide information on the nearest downstream monitoring station, including how far downstream the monitoring station is from the outfall.

   This facility discharges to an unnamed tributary to Great Run (streamcode XHS) that has not been monitored or assessed. Unnamed tributary to Great Run (streamcode XAC) is located approximately 0.26 miles downstream from Outfall 001 and DEQ ambient monitoring station 3-XAC000.58 is located on stream XAC at Route 802, approximately 1.1 miles downstream from outfall 001. The following is the water quality summary for this segment of XAC, as taken from the Draft 2014 Integrated Report:

   Class III, Section 4.

   DEQ monitoring stations located in this segment of the unnamed tributary to Great Run (streamcode XAC):
   - *ambient monitoring station 3-XAC000.58, at Route 802*

   The aquatic life use is listed as supporting with an observed effect based on temperature data. The recreational use is listed as insufficient with an observed effect. The wildlife use was not assessed. The fish consumption use is categorized as not assessed.

2. Does this facility discharge to a stream segment on the 303(d) list? If yes, please fill out Table A.

   No.

3. Are there any downstream 303(d) listed impairments within 15 miles of this facility that are relevant to this discharge? If yes, please fill out Table B.

   Yes.

Table B. Information on Downstream 303(d) Impairments and TMDLs

Waterbody Name	Impaired Use	Cause	Distance From Outfall	TMDL completed	WLA	Basis for WLA	TMDL Schedule
Impairment Information in the Draft 2014 Integrated Report							
Great Run	Aquatic Life	Benthic macroinvertebrates	1.7 miles	---	---	---	2022
	Recreation	*E. coli*		Great Run Bacteria 03/10/2005	4.35E+10 cfu/year *E. coli*	126 cfu/100 ml *E. coli* --- 2.5 MGD	---

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

   There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

   DEQ planning staff requests this facility continue nutrient monitoring, specifically total phosphorus, nitrate, nitrite, ammonia, and TKN. Nutrient monitoring is requested of facilities that are located within a five mile distance upstream of a benthic impairment.

   The tidal Rappahannock River, which is located approximately 53 miles downstream of this facility, is listed with a PCB impairment. In support for the PCB TMDL that is scheduled for development by 2016 for the tidal Rappahannock River, this facility is a candidate for low-level PCB monitoring, based upon its designation as a minor municipal discharger. Low-level PCB analysis uses EPA Method 1668, which is capable of detecting low-level concentrations for all 209 PCB congeners. DEQ staff has concluded that low-level PCB monitoring is not warranted for this facility, as it is located in the headwaters of the Rappahannock River watershed and there are not any stream segments immediately downstream of the facility that are listed with a PCB impairment. Fish tissue monitoring has been conducted in Great Run and the non-tidal Rappahannock River, and there have been no exceedances of the fish tissue criterion for PCBs. Based upon this information, this facility will not be requested to monitor for low-level PCBs.

5. Fact Sheet Requirements – Please provide information regarding any drinking water intakes located within a 5 mile radius of the discharge point.

   There is one drinking water intake for the Town of Warrenton located within a five mile radius of Outfall 001.

ATTACHMENT 7

Water Quality Criteria / Wasteload Allocation Analysis

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Town of Warrenton WWTP Permit No.: VA0021172

Receiving Stream: Great Run, UT Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	44.6 mg/L	1Q10 (Annual) =	0.011 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	115 mg/L
90% Temperature (Annual) =	22.6 deg C	7Q10 (Annual) =	0.013 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	13 deg C	30Q10 (Annual) =	0.025 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	15 deg C
90% Maximum pH =	7.6 SU	1Q10 (Wet season) =	0.101 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	8.2 SU
10% Maximum pH =	6.8 SU	30Q10 (Wet season)	0.176 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7.1 SU
Tier Designation (1 or 2) =	1	30Q5 =	0.041 MGD			Discharge Flow =	2.5 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0.199 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.5E+00	--	--	--	--	--	--	--	--	--	--	na	9.5E+00
Acrylonitrile[c]	0	--	--	na	2.5E+00	--	--	na	2.7E+00	--	--	--	--	--	--	--	--	--	--	na	2.7E+00
Aldrin[c]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.4E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.4E-04
Ammonia-N (mg/l) (Yearly)	0	5.79E+00	9.32E-01	na	--	5.82E+00	9.42E-01	na	--	--	--	--	--	--	--	--	--	5.82E+00	9.42E-01	na	--
Ammonia-N (mg/l) (High Flow)	0	6.28E+00	1.98E+00	na	--	6.53E+00	2.12E+00	na	--	--	--	--	--	--	--	--	--	6.53E+00	2.12E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.1E+04	--	--	--	--	--	--	--	--	--	--	na	4.1E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	6.5E+02	--	--	--	--	--	--	--	--	--	--	na	6.5E+02
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene[c]	0	--	--	na	5.1E+02	--	--	na	5.5E+02	--	--	--	--	--	--	--	--	--	--	na	5.5E+02
Benzidine[c]	0	--	--	na	2.0E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-03
Benzo (a) anthracene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (b) fluoranthene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (k) fluoranthene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (a) pyrene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Bis2-Chloroethyl Ether[c]	0	--	--	na	5.3E+00	--	--	na	5.7E+00	--	--	--	--	--	--	--	--	--	--	na	5.7E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	6.6E+04	--	--	--	--	--	--	--	--	--	--	na	6.6E+04
Bis 2-Ethylhexyl Phthalate[c]	0	--	--	na	2.2E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Bromoform[c]	0	--	--	na	1.4E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
Cadmium	0	4.6E+00	1.3E+00	na	--	4.6E+00	1.3E+00	na	--	--	--	--	--	--	--	--	--	4.6E+00	1.3E+00	na	--
Carbon Tetrachloride[c]	0	--	--	na	1.6E+01	--	--	na	1.7E+01	--	--	--	--	--	--	--	--	--	--	na	1.7E+01
Chlordane[c]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.7E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.7E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[6]	0	--	--	na	1.3E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	6.4E+02	8.3E+01	na	--	6.4E+02	8.3E+01	na	--	--	--	--	--	--	--	--	--	6.4E+02	8.3E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[c]	0	--	--	na	1.8E-02	--	--	na	1.9E-02	--	--	--	--	--	--	--	--	--	--	na	1.9E-02
Copper	0	1.5E+01	1.0E+01	na	--	1.5E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	1.5E+01	1.0E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	1.6E+04
DDD[c]	0	--	--	na	3.1E-03	--	--	na	3.3E-03	--	--	--	--	--	--	--	--	--	--	na	3.3E-03
DDE[c]	0	--	--	na	2.2E-03	--	--	na	2.4E-03	--	--	--	--	--	--	--	--	--	--	na	2.4E-03
DDT[c]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.4E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.4E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.8E+02	--	--	--	--	--	--	--	--	--	--	na	9.8E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
3,3-Dichlorobenzidine[6]	0	--	--	na	2.8E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01
Dichlorobromomethane[c]	0	--	--	na	1.7E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
1,2-Dichloroethane[c]	0	--	--	na	3.7E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.2E+03	--	--	--	--	--	--	--	--	--	--	na	7.2E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[6]	0	--	--	na	1.5E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
1,3-Dichloropropene[c]	0	--	--	na	2.1E+02	--	--	na	2.3E+02	--	--	--	--	--	--	--	--	--	--	na	2.3E+02
Dieldrin[c]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.8E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.8E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.5E+04	--	--	--	--	--	--	--	--	--	--	na	4.5E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.6E+02	--	--	--	--	--	--	--	--	--	--	na	8.6E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	--	--	na	1.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	--	--	na	4.6E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
2,4-Dinitrotoluene[c]	0	--	--	na	3.4E+01	--	--	na	3.7E+01	--	--	--	--	--	--	--	--	--	--	na	3.7E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.2E-08	--	--	--	--	--	--	--	--	--	--	na	5.2E-08
1,2-Diphenylhydrazine[6]	0	--	--	na	2.0E+00	--	--	na	2.2E+00	--	--	--	--	--	--	--	--	--	--	na	2.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	9.0E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	9.0E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	9.0E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	9.0E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	9.0E+01	--	--	--	--	--	--	--	--	--	--	na	9.0E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.1E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	6.1E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.4E+03	--	--	--	--	--	--	--	--	--	--	na	5.4E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor[c]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	8.5E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	8.5E-04
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	4.2E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	4.2E-04
Hexachlorobenzene[c]	0	--	--	na	2.9E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-03
Hexachlorobutadiene[c]	0	--	--	na	1.8E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	na	4.9E-02	--	--	na	5.3E-02	--	--	--	--	--	--	--	--	--	--	na	5.3E-02
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	na	1.7E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.9E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.9E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Hexachloroethane[c]	0	--	--	na	3.3E+01	--	--	na	3.6E+01	--	--	--	--	--	--	--	--	--	--	na	3.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene[c]	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone[c]	0	--	--	na	9.6E+03	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.4E+02	1.6E+01	na	--	1.4E+02	1.6E+01	na	--	--	--	--	--	--	--	--	--	1.4E+02	1.6E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Methylene Chloride[c]	0	--	--	na	5.9E+03	--	--	na	6.4E+03	--	--	--	--	--	--	--	--	--	--	na	6.4E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.0E+02	2.3E+01	na	4.6E+03	2.1E+02	2.3E+01	na	4.7E+03	--	--	--	--	--	--	--	--	2.1E+02	2.3E+01	na	4.7E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	7.0E+02	--	--	--	--	--	--	--	--	--	--	na	7.0E+02
N-Nitrosodimethylamine[c]	0	--	--	na	3.0E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
N-Nitrosodiphenylamine[c]	0	--	--	na	6.0E+01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	--	--	na	6.5E+01
N-Nitrosodi-n-propylamine[c]	0	--	--	na	5.1E+00	--	--	na	5.5E+00	--	--	--	--	--	--	--	--	--	--	na	5.5E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total[c]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.9E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.9E-04
Pentachlorophenol[c]	0	9.6E+00	7.4E+00	na	3.0E+01	9.7E+00	7.4E+00	na	3.2E+01	--	--	--	--	--	--	--	--	9.7E+00	7.4E+00	na	3.2E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	8.7E+05	--	--	--	--	--	--	--	--	--	--	na	8.7E+05
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.1E+00	--	--	--	--	--	--	--	--	--	--	na	4.1E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.3E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**4.3E+03**
Silver	0	4.4E+00	--	na	--	4.4E+00	--	na	--	--	--	--	--	--	--	--	--	**4.4E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	4.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.8E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	6.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.1E+03**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene[C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	3.0E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**3.0E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.2E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.1E+01**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+02**
Trichloroethylene[C]	0	--	--	na	3.0E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.2E+02**
2,4,6-Trichlorophenol[C]	0	--	--	na	2.4E+01	--	--	na	2.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+01**
Zinc	0	1.3E+02	1.3E+02	na	2.6E+04	1.3E+02	1.3E+02	na	2.6E+04	--	--	--	--	--	--	--	--	**1.3E+02**	**1.3E+02**	**na**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.5E+02
Arsenic	9.0E+01
Barium	na
Cadmium	7.6E-01
Chromium III	5.0E+01
Chromium VI	6.4E+00
Copper	6.1E+00
Iron	na
Lead	9.7E+00
Manganese	na
Mercury	4.6E-01
Nickel	1.4E+01
Selenium	3.0E+00
Silver	1.8E+00
Zinc	5.3E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

ATTACHMENT 8

Effluent pH Data
May 2011 – September 2015

DMR QA/QC

Permit #:VA0021172	Facility:Warrenton Town Sewage Treatment Plant

Due	Parameter Description	QTY AVG	Lim Avg	QTY MAX	Lim Max	CONC MIN	Lim Min	CONC AVG	Lim Avg	CONC MAX	Lim Max
10-Jun-2011	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	7.9	9.0
10-Jul-2011	pH	NULL	**********	NULL	**********	7.6	6.0	NULL	**********	8.3	9.0
10-Aug-2011	pH	NULL	**********	NULL	**********	7.5	6.0	NULL	**********	8.3	9.0
10-Sep-2011	pH	NULL	**********	NULL	**********	7.8	6.0	NULL	**********	8.5	9.0
10-Oct-2011	pH	NULL	**********	NULL	**********	8.4	6.0	NULL	**********	7.5	9.0
10-Nov-2011	pH	NULL	**********	NULL	**********	7.4	6.0	NULL	**********	8.2	9.0
10-Dec-2011	pH	NULL	**********	NULL	**********	7.6	6.0	NULL	**********	8.3	9.0
10-Jan-2012	pH	NULL	**********	NULL	**********	7.4	6.0	NULL	**********	8	9.0
10-Feb-2012	pH	NULL	**********	NULL	**********	7.5	6.0	NULL	**********	8.1	9.0
10-Mar-2012	pH	NULL	**********	NULL	**********	7.5	6.0	NULL	**********	8	9.0
10-Apr-2012	pH	NULL	**********	NULL	**********	7.2	6.0	NULL	**********	8.1	9.0
10-May-2012	pH	NULL	**********	NULL	**********	7.8	6.0	NULL	**********	8.2	9.0
10-Jun-2012	pH	NULL	**********	NULL	**********	7.7	6.0	NULL	**********	8.2	9.0
10-Jul-2012	pH	NULL	**********	NULL	**********	7.7	6.0	NULL	**********	8.2	9.0
10-Aug-2012	pH	NULL	**********	NULL	**********	8	6.0	NULL	**********	8.4	9.0
10-Sep-2012	pH	NULL	**********	NULL	**********	7.9	6.0	NULL	**********	8.3	9.0
10-Oct-2012	pH	NULL	**********	NULL	**********	7.8	6.0	NULL	**********	8.2	9.0
10-Nov-2012	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	8.4	9.0
10-Dec-2012	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8.2	9.0
10-Jan-2013	pH	NULL	**********	NULL	**********	7.7	6.0	NULL	**********	8.4	9.0
10-Feb-2013	pH	NULL	**********	NULL	**********	7.6	6.0	NULL	**********	8.2	9.0
10-Mar-2013	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	8	9.0
10-Apr-2013	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.8	9.0
10-May-2013	pH	NULL	**********	NULL	**********	7.5	6.0	NULL	**********	7.9	9.0
10-Jun-2013	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8.2	9.0
10-Jul-2013	pH	NULL	**********	NULL	**********	7.5	6.0	NULL	**********	8.2	9.0
10-Aug-2013	pH	NULL	**********	NULL	**********	7.4	6.0	NULL	**********	8.2	9.0
10-Sep-2013	pH	NULL	**********	NULL	**********	7.7	6.0	NULL	**********	8.4	9.0
10-Oct-2013	pH	NULL	**********	NULL	**********	7.8	6.0	NULL	**********	8.2	9.0
10-Nov-2013	pH	NULL	**********	NULL	**********	7.4	6.0	NULL	**********	8.1	9.0
10-Dec-2013	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	8	9.0

10-Jan-2014	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	7.7	9.0
10-Feb-2014	pH	NULL	**********	NULL	**********	7	6.0	NULL	**********	8.1	9.0
10-Mar-2014	pH	NULL	**********	NULL	**********	7.2	6.0	NULL	**********	7.8	9.0
10-Apr-2014	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	8.1	9.0
10-May-2014	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8	9.0
10-Jun-2014	pH	NULL	**********	NULL	**********	6.9	6.0	NULL	**********	8	9.0
10-Jul-2014	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8	9.0
10-Aug-2014	pH	NULL	**********	NULL	**********	7.2	6.0	NULL	**********	8	9.0
10-Sep-2014	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8	9.0
10-Oct-2014	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	8	9.0
10-Nov-2014	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.8	9.0
10-Dec-2014	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	7.9	9.0
10-Jan-2015	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.9	9.0
10-Feb-2015	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.8	9.0
10-Mar-2015	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.7	9.0
10-Apr-2015	pH	NULL	**********	NULL	**********	7.2	6.0	NULL	**********	7.6	9.0
10-May-2015	pH	NULL	**********	NULL	**********	7.1	6.0	NULL	**********	7.7	9.0
10-Jun-2015	pH	NULL	**********	NULL	**********	7.3	6.0	NULL	**********	7.8	9.0
10-Jul-2015	pH	NULL	**********	NULL	**********	7	6.0	NULL	**********	7.9	9.0
10-Aug-2015	pH	NULL	**********	NULL	**********	7	6.0	NULL	**********	7.7	9.0
10-Sep-2015	pH	NULL	**********	NULL	**********	7.2	6.0	NULL	**********	8.2	9.0
10-Oct-2015	pH	NULL	**********	NULL	**********	7.4	6.0	NULL	**********	8	9.0

All reported pH data: **90th percentile: 8.2 S.U.**
10th percentile: 7.1 S.U.

ATTACHMENT 9

Ambient Data for VAN-E02R

Field Parameter and Hardness Percentiles for the Northern Region by 8-Digit HUC and Watershed

Calculations based on available data from the period 1-1-1990 to 2-28-2011

*Wet Season refers to December - April.

HUC/Watershed Code	90% Temperature (°C) Annual	90% Temperature (°C) Wet Season	90% Max pH (SU) Annual	10% Max pH (SU) Annual	Average Hardness
Rappahannock River Basin					
VAN-E01R	23.0	12.0	7.7	6.9	34.7
VAN-E02R	22.6	13.0	7.6	6.8	44.6
VAN-E03R	23.4	13.8	7.8	6.7	12.6
VAN-E04R	24.2	14.0	7.7	6.7	14.2
VAN-E05R	23.2	13.9	7.8	7.0	24.0
VAN-E06R	23.8	14.9	7.9	6.8	28.4
VAN-E07R	23.0	16.4	7.5	6.6	28.3
VAN-E08R	24.8	14.7	7.6	6.9	80.0
VAN-E09R	24.9	18.0	7.6	6.8	62.0
VAN-E10R	22.7	13.6	7.5	6.5	26.6
VAN-E11R	22.7	15.6	7.9	6.8	15.6
VAN-E12R	26.0	14.2	7.9	6.9	19.0
VAN-E13R	24.6	13.8	7.6	6.9	29.5
VAN-E14R	22.5	14.6	8.1	6.5	15.0
VAN-E15R	24.0	13.4	7.6	6.7	23.0
VAN-E16R	25.7	15.4	8.0	6.7	101.6
VAN-E17R	22.6	12.2	7.7	6.7	44.0
VAN-E18R	25.3	15.7	8.0	6.8	27.1

ATTACHMENT 10

Effluent Data
May 2011 – September 2015

DMR QA/QC

Permit #:VA0021172	Facility:Warrenton Town Sewage Treatment Plant

Due	Parameter Description	QTY AVG	Lim Avg	QTY MAX	Lim Max	CONC MIN	Lim Min	CONC AVG	Lim Avg	CONC MAX	Lim Max
10-Jun-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.1	1.4	0.2	1.7
10-Jul-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<0.2	1.4	0.2	1.7
10-Aug-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Sep-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Oct-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Nov-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Dec-2011	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	0.2	1.7
10-Jan-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Feb-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Mar-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.2	1.4	0.5	1.7
10-Apr-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.3	1.4	0.9	1.7
10-May-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.3	1.4	1.2	1.7
10-Jun-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Jul-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Aug-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Sep-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Oct-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Nov-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.2	1.4	<QL	1.7
10-Dec-2012	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Jan-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Feb-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Mar-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Apr-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-May-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Jun-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Jul-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Aug-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Sep-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	<QL	1.4	<QL	1.7
10-Oct-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.5	1.4	0.7	1.7
10-Nov-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.8	1.4	0.7	1.7
10-Dec-2013	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	1.4	1.4	1.5	1.7
10-Jan-2014	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	0.8	1.4	1.2	1.7
10-Feb-2014	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	1.6	1.4	2.0	1.7
10-Mar-2014	AMMONIA, AS N	NULL	*********	NULL	*********	NULL	*********	1.2	1.4	1.6	1.7
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10-Jul-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	3.1	NL	NULL	**********
10-Aug-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	3.1	NL	NULL	**********
10-Sep-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.8	NL	NULL	**********
10-Oct-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.6	NL	NULL	**********
10-Nov-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	0.8	NL	NULL	**********
10-Dec-2011	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.0	NL	NULL	**********
10-Jan-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.3	NL	NULL	**********
10-Feb-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.0	NL	NULL	**********
10-Mar-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	0.7	NL	NULL	**********
10-Apr-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	2.3	NL	NULL	**********
10-May-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	2.0	NL	NULL	**********
10-Jun-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.2	NL	NULL	**********
10-Jul-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.8	NL	NULL	**********
10-Aug-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.3	NL	NULL	**********
10-Sep-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.4	NL	NULL	**********
10-Oct-2012	NITRITE+NITRATE-N,TOTAL	NULL	**********	NULL	**********	NULL	**********	1.1	NL	NULL	**********

10-Nov-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	4.0	NL	NULL	*********
10-Dec-2012	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.6	NL	NULL	*********
10-Jan-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.8	NL	NULL	*********
10-Feb-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
10-Mar-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
10-Apr-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.3	NL	NULL	*********
10-May-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
10-Jun-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	.93	NL	NULL	*********
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10-Aug-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.9	NL	NULL	*********
10-Sep-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.8	NL	NULL	*********
10-Oct-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.1	NL	NULL	*********
10-Nov-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.1	NL	NULL	*********
10-Dec-2013	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.2	NL	NULL	*********
10-Jan-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.5	NL	NULL	*********
10-Feb-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.9	NL	NULL	*********
10-Mar-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.1	NL	NULL	*********
10-Apr-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.3	NL	NULL	*********
10-May-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
10-Jun-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.3	NL	NULL	*********
10-Jul-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.0	NL	NULL	*********
10-Aug-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.6	NL	NULL	*********
10-Sep-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.1	NL	NULL	*********
10-Oct-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.3	NL	NULL	*********
10-Nov-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.1	NL	NULL	*********
10-Dec-2014	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.7	NL	NULL	*********
10-Jan-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.6	NL	NULL	*********
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10-Mar-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.4	NL	NULL	*********
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10-May-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	2.0	NL	NULL	*********
10-Jun-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.9	NL	NULL	*********
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10-Aug-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	3.5	NL	NULL	*********
10-Sep-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	1.0	NL	NULL	*********
10-Oct-2015	NITRITE+NITRATE-N,TOTAL	NULL	*********	NULL	*********	NULL	*********	0.7	NL	NULL	*********
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10-Aug-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	3.2	NL	NULL	*********
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10-Oct-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	3.9	NL	NULL	*********
10-Nov-2013	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	3.6	NL	NULL	*********
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10-Mar-2014	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	3.9	NL	NULL	*********
10-Apr-2014	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	3.5	NL	NULL	*********
10-May-2014	NITROGEN, TOTAL (AS N)	NULL	*********	NULL	*********	NULL	*********	2.3	NL	NULL	*********
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10-Aug-2015	NITROGEN, TOTAL (AS N)	NULL	**********	NULL	**********	NULL	**********	5.4	NL	NULL	**********
10-Sep-2015	NITROGEN, TOTAL (AS N)	NULL	**********	NULL	**********	NULL	**********	2.8	NL	NULL	**********
10-Oct-2015	NITROGEN, TOTAL (AS N)	NULL	**********	NULL	**********	NULL	**********	2.4	NL	NULL	**********
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10-Jan-2014	NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	NULL	**********	NULL	**********	NULL	**********	3.4	4.0	NULL	**********
10-Jan-2015	NITROGEN, TOTAL (AS N) (CALENDAR YEAR)	NULL	**********	NULL	**********	NULL	**********	3.4	4.0	NULL	**********
10-Jun-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Jul-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.6	NL	NULL	**********
10-Aug-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.6	NL	NULL	**********
10-Sep-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.6	NL	NULL	**********
10-Oct-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.5	NL	NULL	**********
10-Nov-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Dec-2011	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Jan-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Feb-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.2	NL	NULL	**********
10-Mar-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.0	NL	NULL	**********
10-Apr-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-May-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.7	NL	NULL	**********
10-Jun-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-Jul-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-Aug-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-Sep-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-Oct-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.5	NL	NULL	**********
10-Nov-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-Dec-2012	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-Jan-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.1	NL	NULL	**********
10-Feb-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.0	NL	NULL	**********
10-Mar-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.2	NL	NULL	**********
10-Apr-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-May-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.5	NL	NULL	**********
10-Jun-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.5	NL	NULL	**********
10-Jul-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.5	NL	NULL	**********
10-Aug-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	2.6	NL	NULL	**********
10-Sep-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.0	NL	NULL	**********
10-Oct-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.1	NL	NULL	**********
10-Nov-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.1	NL	NULL	**********
10-Dec-2013	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Jan-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Feb-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	4.1	NL	NULL	**********
10-Mar-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	4.0	NL	NULL	**********
10-Apr-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.8	NL	NULL	**********
10-May-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.5	NL	NULL	**********
10-Jun-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.5	NL	NULL	**********

10-Jul-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.6	NL	NULL	**********
10-Aug-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.6	NL	NULL	**********
10-Sep-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Oct-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Nov-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Dec-2014	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Jan-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Feb-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	4.0	NL	NULL	**********
10-Mar-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.7	NL	NULL	**********
10-Apr-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-May-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-Jun-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-Jul-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.0	NL	NULL	**********
10-Aug-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.4	NL	NULL	**********
10-Sep-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.3	NL	NULL	**********
10-Oct-2015	NITROGEN, TOTAL (AS N) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	3.2	NL	NULL	**********
10-Jun-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jul-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Aug-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Sep-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Oct-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Nov-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Dec-2011	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Jan-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Feb-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Mar-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Apr-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-May-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jun-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jul-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Aug-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Sep-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Oct-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.3	NL	NULL	**********
10-Nov-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Dec-2012	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.0	NL	NULL	**********
10-Jan-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Feb-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.01	NL	NULL	**********
10-Mar-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Apr-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.02	NL	NULL	**********
10-May-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.0	NL	NULL	**********
10-Jun-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.07	NL	NULL	**********
10-Jul-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Aug-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********

10-Sep-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.4	NL	NULL	**********
10-Oct-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Nov-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Dec-2013	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Jan-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.03	NL	NULL	**********
10-Feb-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.08	NL	NULL	**********
10-Mar-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.06	NL	NULL	**********
10-Apr-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-May-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Jun-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jul-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Aug-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.4	NL	NULL	**********
10-Sep-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Oct-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Nov-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Dec-2014	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jan-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Feb-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.03	NL	NULL	**********
10-Mar-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Apr-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.09	NL	NULL	**********
10-May-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.4	NL	NULL	**********
10-Jun-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Jul-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.13	NL	NULL	**********
10-Aug-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.14	NL	NULL	**********
10-Sep-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Oct-2015	PHOSPHORUS, TOTAL (AS P)	NULL	**********	NULL	**********	NULL	**********	.16	NL	NULL	**********
10-Jan-2013	PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	NULL	**********	NULL	**********	NULL	**********	0.2	0.3	NULL	**********
10-Jan-2014	PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	NULL	**********	NULL	**********	NULL	**********	0.1	0.3	NULL	**********
10-Jan-2015	PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR)	NULL	**********	NULL	**********	NULL	**********	0.2	0.3	NULL	**********
10-Jun-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.1	NL	NULL	**********
10-Jul-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Aug-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Sep-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Oct-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Nov-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Dec-2011	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jan-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Feb-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Mar-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.3	NL	NULL	**********
10-Apr-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-May-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jun-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********
10-Jul-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	**********	NULL	**********	NULL	**********	0.2	NL	NULL	**********

10-Aug-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Sep-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Oct-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Nov-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Dec-2012	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Jan-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Feb-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.01	NL	NULL	*********
10-Mar-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Apr-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-May-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.0	NL	NULL	*********
10-Jun-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Jul-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Aug-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Sep-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Oct-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Nov-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Dec-2013	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Jan-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Feb-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.08	NL	NULL	*********
10-Mar-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.07	NL	NULL	*********
10-Apr-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-May-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Jun-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.1	NL	NULL	*********
10-Jul-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Aug-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Sep-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Oct-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Nov-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Dec-2014	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Jan-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	0.2	NL	NULL	*********
10-Feb-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.03	NL	NULL	*********
10-Mar-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.04	NL	NULL	*********
10-Apr-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.06	NL	NULL	*********
10-May-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.15	NL	NULL	*********
10-Jun-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.18	NL	NULL	*********
10-Jul-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.17	NL	NULL	*********
10-Aug-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.17	NL	NULL	*********
10-Sep-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.19	NL	NULL	*********
10-Oct-2015	PHOSPHORUS, TOTAL (AS P) (YEAR-TO-DATE)	NULL	*********	NULL	*********	NULL	*********	.18	NL	NULL	*********
10-Jun-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.6	NL	1.9	NL
10-Jul-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.6	NL
10-Aug-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.9	NL	1.3	NL
10-Sep-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.4	NL	2.1	NL

10-Oct-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.5	NL	2.0	NL
10-Nov-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.7	NL
10-Dec-2011	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.7	NL	2.8	NL
10-Jan-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.6	NL	3.0	NL
10-Feb-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.9	NL
10-Mar-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	1.1	NL
10-Apr-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.6	NL
10-May-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.9	NL	1.2	NL
10-Jun-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.5	NL
10-Jul-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.9	NL	1.1	NL
10-Aug-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.7	NL
10-Sep-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.1	NL
10-Oct-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.1	NL
10-Nov-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	5.3	NL	9.5	NL
10-Dec-2012	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.5	NL	1.6	NL
10-Jan-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.8	NL	1.2	NL
10-Feb-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.8	NL	0.7	NL
10-Mar-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.7	NL
10-Apr-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	2.5	NL
10-May-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.6	NL
10-Jun-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.7	NL	2.8	NL
10-Jul-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.5	NL
10-Aug-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.9	NL
10-Sep-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.5	NL	1.7	NL
10-Oct-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.9	NL	3.2	NL
10-Nov-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.5	NL	1.5	NL
10-Dec-2013	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.6	NL	2.2	NL
10-Jan-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.6	NL	1.7	NL
10-Feb-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.9	NL
10-Mar-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.9	NL	2.3	NL
10-Apr-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.5	NL
10-May-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	1.5	NL
10-Jun-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.6	NL	2.5	NL
10-Jul-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.9	NL	1.6	NL
10-Aug-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	0.8	NL	1.8	NL
10-Sep-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.6	NL
10-Oct-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.6	NL
10-Nov-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	1.6	NL
10-Dec-2014	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.4	NL
10-Jan-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.3	NL
10-Feb-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	2.0	NL
10-Mar-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.5	NL
10-Apr-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.0	NL	1.3	NL

10-May-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.1	NL	1.7	NL
10-Jun-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.2	NL	1.9	NL
10-Jul-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.3	NL	1.1	NL
10-Aug-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.8	NL	1.8	NL
10-Sep-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.8	NL	2.2	NL
10-Oct-2015	TKN (N-KJEL)	NULL	*********	NULL	*********	NULL	*********	1.7	NL	2.0	NL
10-Jun-2011	TSS	14	95	20	140	NULL	*********	2	10	3	15
10-Jul-2011	TSS	10	95	11	140	NULL	*********	2	10	2	15
10-Aug-2011	TSS	9	95	11	140	NULL	*********	2	10	2	15
10-Sep-2011	TSS	8	95	10	140	NULL	*********	2	10	2	15
10-Oct-2011	TSS	10	95	11	140	NULL	*********	2	10	2	15
10-Nov-2011	TSS	11	95	13	140	NULL	*********	2	10	2	15
10-Dec-2011	TSS	10	95	10	140	NULL	*********	2	10	2	15
10-Jan-2012	TSS	11	95	11	140	NULL	*********	1	10	2	15
10-Feb-2012	TSS	13	95	14	140	NULL	*********	2	10	2	15
10-Mar-2012	TSS	9	95	11	140	NULL	*********	1	10	2	15
10-Apr-2012	TSS	8	95	10	140	NULL	*********	1	10	2	15
10-May-2012	TSS	9	95	10	140	NULL	*********	2	10	2	15
10-Jun-2012	TSS	10	95	14	140	NULL	*********	2	10	2	15
10-Jul-2012	TSS	8	95	10	140	NULL	*********	1	10	2	15
10-Aug-2012	TSS	7	95	12	140	NULL	*********	1	10	2	15
10-Sep-2012	TSS	3	95	5	140	NULL	*********	<QL	10	1	15
10-Oct-2012	TSS	5	95	7	140	NULL	*********	<QL	10	1	15
10-Nov-2012	TSS	1	95	5	140	NULL	*********	<QL	10	<QL	15
10-Dec-2012	TSS	<QL	95	<QL	140	NULL	*********	<QL	10	<QL	15
10-Jan-2013	TSS	10	95	14	140	NULL	*********	2	10	2	15
10-Feb-2013	TSS	8	95	11	140	NULL	*********	1	10	1	15
10-Mar-2013	TSS	12	95	16	140	NULL	*********	2	10	2	15
10-Apr-2013	TSS	5	95	12	140	NULL	*********	<QL	10	1	15
10-May-2013	TSS	2	95	6	140	NULL	*********	<QL	10	<QL	15
10-Jun-2013	TSS	3	95	5	140	NULL	*********	<QL	10	<QL	15
10-Jul-2013	TSS	5	95	7	140	NULL	*********	1	10	1	15
10-Aug-2013	TSS	4	95	14	140	NULL	*********	<QL	10	1	15
10-Sep-2013	TSS	4	95	6	140	NULL	*********	<QL	10	<QL	15
10-Oct-2013	TSS	4.0	95	6.0	140	NULL	*********	<QL	10	1.0	15
10-Nov-2013	TSS	7	95	12	140	NULL	*********	1	10	2	15
10-Dec-2013	TSS	12	95	16	140	NULL	*********	2	10	3	15
10-Jan-2014	TSS	7	95	10	140	NULL	*********	1	10	1	15
10-Feb-2014	TSS	11	95	15	140	NULL	*********	1	10	2	15
10-Mar-2014	TSS	10	95	16	140	NULL	*********	1	10	2	15
10-Apr-2014	TSS	9	95	14	140	NULL	*********	1	10	2	15
10-May-2014	TSS	7	95	7	140	NULL	*********	1	10	1	15
10-Jun-2014	TSS	2	95	3	140	NULL	*********	<QL	10	<QL	15

10-Jul-2014	TSS	35	95	95	140	NULL	**********	4	10	11	15
10-Aug-2014	TSS	10	95	12	140	NULL	**********	2	10	2	15
10-Sep-2014	TSS	7	95	8	140	NULL	**********	1	10	1	15
10-Oct-2014	TSS	4	95	7	140	NULL	**********	1	10	1	15
10-Nov-2014	TSS	4	95	5	140	NULL	**********	1	10	1	15
10-Dec-2014	TSS	8	95	12	140	NULL	**********	1	10	2	15
10-Jan-2015	TSS	7	95	14	140	NULL	**********	1	10	2	15
10-Feb-2015	TSS	4	95	6	140	NULL	**********	1	10	1	15
10-Mar-2015	TSS	5	95	9	140	NULL	**********	1	10	1	15
10-Apr-2015	TSS	14	95	17	140	NULL	**********	2	10	2	15
10-May-2015	TSS	21	95	27	140	NULL	**********	3	10	4	15
10-Jun-2015	TSS	13	95	19	140	NULL	**********	2	10	3	15
10-Jul-2015	TSS	21	95	27	140	NULL	**********	3	10	4	15
10-Aug-2015	TSS	9	95	10	140	NULL	**********	1	10	2	15
10-Sep-2015	TSS	13	95	15	140	NULL	**********	2	10	3	15
10-Oct-2015	TSS	10	95	12	140	NULL	**********	2	10	2	15

ATTACHMENT 11

Mixing Analysis

Mixing Zone Predictions for Town of Warrenton WWTP

Low flow

Effluent Flow = 2.5 MGD
Stream 7Q10 = 0.013 MGD
Stream 30Q10 = 0.025 MGD
Stream 1Q10 = 0.011 MGD
Stream slope = 0.0008 ft/ft
Stream width = 10 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .8901 ft
Length = 129.71 ft
Velocity = .437 ft/sec
Residence Time = .0034 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .8923 ft
Length = 129.46 ft
Velocity = .4378 ft/sec
Residence Time = .0034 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .8897 ft
Length = 129.75 ft
Velocity = .4369 ft/sec
Residence Time = .0825 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Mixing Zone Predictions for Town of Warrenton WWTP

High flow

Effluent Flow = 2.5 MGD
Stream 7Q10 = 0.125 MGD
Stream 30Q10 = 0.176 MGD
Stream 1Q10 = 0.101 MGD
Stream slope = 0.0008 ft/ft
Stream width = 10 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .9152 ft
Length = 126.37 ft
Velocity = .444 ft/sec
Residence Time = .0033 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .926 ft
Length = 125.03 ft
Velocity = .447 ft/sec
Residence Time = .0032 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .9099 ft
Length = 127.05 ft
Velocity = .4425 ft/sec
Residence Time = .0798 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

ATTACHMENT 12

Ammonia Limitation Derivation

4/6/2016 10:26:30 AM

Facility = Town of Warrenton WWTP
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 5.8
WLAc = 0.94
Q.L. = 0.4
# samples/mo. = 20
# samples/wk. = 5

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.89660988781133
Average Weekly limit = 1.23613127369886
Average Monthly LImit = 0.97609363211797

The data are:

9

ATTACHMENT 13

Chromium, Copper and Zinc
Reasonable Potential Analyses

2/29/2016 10:06:36 AM

Facility = Town of Warrenton WWTP
Chemical = Chromium
Chronic averaging period = 4
WLAa = 16
WLAc = 11
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 4.63874
Variance = 7.74646
C.V. = 0.6
97th percentile daily values = 11.2880
97th percentile 4 day average = 7.71789
97th percentile 30 day average= 5.59457
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0
6.46
0

2/29/2016 10:08:18 AM

Facility = Town of Warrenton WWTP
Chemical = Copper
Chronic averaging period = 4
WLAa = 15
WLAc = 10
Q.L. = 5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 4.63874
Variance = 7.74646
C.V. = 0.6
97th percentile daily values = 11.2880
97th percentile 4 day average = 7.71789
97th percentile 30 day average= 5.59457
< Q.L. = 2
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

0
5.35
0

2/29/2016 10:09:35 AM

Facility = Town of Warrenton WWTP
Chemical = Zinc
Chronic averaging period = 4
WLAa = 130
WLAc = 130
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 19.1
Variance = 131.331
C.V. = 0.6
97th percentile daily values = 46.4782
97th percentile 4 day average = 31.7783
97th percentile 30 day average= 23.0356
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

19.4
19.8
18.1

ATTACHMENT 14

June 1985 Stream Modeling

MEMORANDUM

State Water Control Board
2111 North Hamilton Street P. O. Box 11143 Richmond, VA. 23230

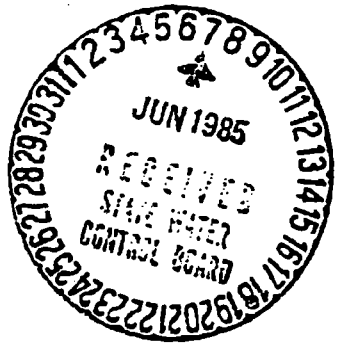
SUBJECT: Town of Warrenton

TO: Dale Phillips - OERS

FROM: Gary Moore Gary

DATE: June 5, 1985

COPIES:



The Town of Warrenton is studying the possibility of expanding its wastewater treatment plant. As part of this study, the Town's consulting engineers have asked that we establish effluent limits for plant flows of 1.5, 2.0 and 2.5 mgd at the existing discharge point (X-trib to Great Run), as well as a discharge at the point where the trib enters Great Run (1.8 miles downstream).

My basic assumptions and model runs are listed on the following pages. As you can see, the first run at 1.5 mgd took the most time to arrive at limits which are acceptable. Since the treatment plant flows constitute 95% or more of the stream flows, these models are flow-independent and the same limits were produced for all STP flows at both discharge points. These limits are: BOD_5 = 10 mg/l, TKN = 5 mg/l, D.O. = 6.5 mg/l.

I ran the standard coefficient sensitivity runs for each flow, and without exception, the limits listed above meet three of the four tests. The minimum D.O. for the most stringent test is 4.7 mg/l. I believe these limits are appropriate for the following reasons:

1. Three of the four sensitivity tests are passed, thus providing an acceptable degree of risk that WQS will not be violated.
2. The most severe test produced a minimum D.O. of 4.7 mg/l. In order to raise this minimum D.O. to 5.0 mg/l, the BOD_5 would have to be in the range which requires carbon columns. In my opinion, desk-top technology does not justify this additional expenditure in order to achieve a very small increase in stream D.O.
3. The existing plant has a design flow rating of 1.0 mgd, and a BOD_5 limit of 18 mg/l. Our recent grab sample and survey results show TKN concentrations of generally 8-10 mg/l. The proposed limits would reduce concentrations for both of these parameters.

I would appreciate your comments on the acceptability of my rationale, as stated above. Please call should questions arise, and as always, thanks for your help.

/cpm

OK MOP
7-16-85

Attachment 11

Warrenton STP 5/23/85

1. Distance from STP to confluence of X-Trib + Great Run = 1.8 mi
2. Distance from 1. to Rt 687 bridge = 5.1 mi
3. Slope from STP to Rt 687 bridge = $\frac{480-320}{6.9\,mi} = 23\frac{ft}{mi} = 0.0044\frac{ft}{ft}$

4. 7Q10 X trib at Great Run = 0.026 mgd (3.73 sq mi)
5. 7Q10 for Great Run at confluence w X-trib = 0.093 mgd (13.65 sq
6. DA from (5) to Rt 687 bridge: 6.8 sq mi (0.046 mgd)
7. assume stream velocity of 0.25 fps
   t from STP to confluence of X-trib + Great Run = 0.44 day
   t from confluence to Rt 687 bridge = 1.25 day
8. Use $K_n = 0.3$
9. $BOD_u = BOD_5 \times 2.5$, $NBD_u = TKN \times 4.33$
10. $DO_{sat} = 7.6$ mg/l

Models will be run for Q_{STP} of 1.5 mgd, 2.0 mgd, 2.5 mgd at existing outfall to X-trib + at confluence of X-trib + Great Run. NBOD and sensitivity testing will be included.

K_2 calculations:

Churchill $K_2 = 11.57 U^{.969} H^{-1.673} = 9.6$
O'Connor $K_2 = 12.27 U^{.5} H^{-1.5} = 17$
Tsivoglou $K_2 = 4235.36\,US = 4.7$
$K_2 = 0.035\left(\frac{\Delta H}{t}\right)24 = 14$

Average of these 4 values = 11

At 30C, $K_2 = 14$

Run model at existing point of discharge:

For $Q_{STP} = 1.5$ mgd

① Try $BOD_5 = 30$, $TKN = 20$, $DO = 6$, $K_1 = .215$, $\alpha_{3C} = .34$

Mass balances:

$$BOD_4 = \frac{(75 \times 1.5) + (3 \times .026)}{1.5 + 0.026} = \frac{112.5 + .078}{1.526} = 74$$

$$NOD_4 = \frac{(87 \times 1.5) + (1.5 \times .026)}{1.526} = 86$$

$$DO = \frac{(6 \times 1.5) + (6.5 \times .026)}{1.526} = 6.0$$

At end of X-Trib ($t = .442$), $DO = 4.3$. Too low

② Try $BOD_5 = 30$, $TKN = 15$

Mass balance: $NOD_4 = \frac{(65 \times 1.5) + (1.5 \times .026)}{1.526} = 64$

At $t = .4$, $DO = 4.7$ Too low

③ Try $BOD_5 = 20$, $TKN = 15$

Mass balance

$$BOD_4 = \frac{(50 \times 1.5) + (3 \times .026)}{1.526} = 49$$

at $t = 0.44$, $DO = 5.3$, Reg DO is 5.2 at $t = 0.2$.

OK, so far

Mass balances with Good Run:

$$BOD_4 = \frac{(1.526 \times 42) + (0.093 \times 3)}{1.526 + 0.093} = \frac{}{1.619} = \underline{40}$$

$$NOD_4 = \frac{(1.526 \times 56) + (0.093 \times .5)}{1.619} = 53$$

$$DO = \frac{(1.526 \times 5.3) + (.093 \times 6.5)}{1.619} = 5.37 \qquad D_a = 7.4 - 5.37 = 2.23$$

S_{ag} is 5.5 at $t = 0.1$;

Sensitivity Analyses

1) double K_1, min DO stretch = 4.2
2) double K_n, " " " = 4.1
3) $K_2/2$, " " = 3.1
4) double $K_1 + K_n$, $K_2/2$, = 0

} No.

④ Try $BOD_5 = 15$, $TKN = 10$, $DO = 6.5$

Mass balances

$K_1 = .17@20, .27@30.$

$$BOD_4 : \frac{(38 \times 1.5) + (3 \times .026)}{1.526} = 37$$

$$NOD_4 = \frac{(43 \times 1.5) + (.5 \times .026)}{1.526} = 42$$

$D_a = 1.1$

Mass bal w Creek flow

$$BOD_4 = \frac{(1.526 \times 33) + (.093 \times 7)}{1.619} = 31$$

$$NOD_4 = \frac{(1.526 \times 37) + (.093 \times .5)}{1.619} = 35$$

$$DO = \frac{(1.526 \times 6.1) + (.093 \times 6.5)}{1.619} = 6.1 \qquad D_2 = 1.5$$

At $t = 0.1$, DO is 6.2. Sag is at mix.

Sensitivity

1) double K_1, min DO = 5.8
2) double K_n, min DO = 5.7
3) $K_2/2$, min DO = 5.2
4) double K_1 & K_n, $K_2/2$, min DO = 3.2 Too Low.

⑤ Try BOD = 15, TKN = 6, DO = 6.5

Mass bal: $NOD_4 = \frac{(26 \times 1.5) + (.5 \times 026)}{1.526} = 26$

DO sag in Stretch 1 = 6.4 at $t = 0.2$

Sensitivity in Stretch 1:

1) double K_1, min DO = 5.8
2) double K_n, min DO = 5.9
3) $K_2/2$, min DO = 5.3
4) double K_1 & K_n, $K_2/2$, min DO = 3.5 Too Low

⑥ Try $BOD_5 = 10$, $TKN = 6$, $DO = 6.5$

Mass bal

$$BOD_u = \frac{(1.5 \times 25) + (3 \times .026)}{1.526} = 25 \qquad K_1 = 0.14,\ d_{30} = .22$$

DO sag in Stretch 1 = 6.6, at $t = 0.44$, DO = 6.7

Sensitivity:

1) double K_1, min DO = 6.3
2) double K_n, min DO = 6.2
3) $K_2/2$, min DO = 5.9
4) double K_1 & K_n, $K_2/2$, min DO = 4.5

⑦ Try $BOD_5 = 10$, $TKN = 5$, $DO = 6.5$

Mass bal $BOD_u = \frac{(1.5 \times 22) + (1.5 \times .026)}{1.526} = 22$

DO sag in stretch 1 = 6.7, at $t = 0.44$ DO = 6.8

Sensitivity

* 4) double $K_1 + K_n$, $K_2/2$, min DO = 4.7

For $Q_{STP} = 2.0$ mgd

Try $BOD_5 = 10$, $TKN = 5$, $DO = 6.5$ $K_1 = .22$

Mass balances, Stretch 1:

$$BOD_u = \frac{(2 \times 25) + (.026 \times 3)}{2.026} = 25$$

$$NOD_u = \frac{(2 \times 22) + (.5 \times .026)}{2.026} = 22$$

$D_a = 1.1$

DO Sag in Stretch 1 = 6.7, adj $t = 0.04$, $DO = 6.8$

Sensitivity:

1) double K_1, min DO = 6.4
2) double K_n, min DO = 6.3
3) $K_2/2$, min DO = 6.0
4) double $K_1 + K_n$, $K_2/2$, min DO = 4.7

For $Q_{STP} = 2.5$ mgd

Try $BOD_5 = 10$, $TKN = 5$, $DO = 6.5$

Mass balance, sketch I:

$$BOD_u = \frac{(2.5 \times 25) + (.026 \times 31)}{2.526} = 25$$

$$NOD_u = \frac{2.5 \times 22 + (.026 \times .5)}{2.526} = 22$$

$D_a = 1.1$

Say DO in Sketch 1 = 6.7 , DO at $t = 0.44 = 6.8$

Sensitivity:

1) double K_1, min DO = 6.4
2) double K_n, min DO = 6.4
3) $K_2/2$, min DO = 6
4) double K_1 & K_n, $K_2/2$, min DO = 4.7

Sketch 2, Mass balance with Grand Run

$$BOD_u = \frac{23 \times 2.526 + 3 \times .093}{2.619} = 22$$

$$NOD_u = \frac{19 \times 2.526 + 1.5 \times .093}{2.619} = 18$$

Sensitivity: double K_1 & K_n, $K_2/2$, min DO = 5.
OK in Grand Run

$$DO = \frac{6.8 \times 2.526 + 6.5 \times .093}{2.619} = 6.8$$

$D_a = 0.8$

Run model for a discharge directly to Great Run

For $Q_{STP} = 1.5$ mgd

① Try $BOD_5 = 15$ mg/l, TKN = 10 mg/l, DO = 6.5

Mass balance: $BOD_4 = \frac{38 \times 1.5 + 3 \times .093}{1.593} = 36$

$NOD_4 = \frac{43 \times 1.5 + .5 \times .093}{1.593} = 41$

$D_a = 1.1$

$t = 1.25$ day from ~~Carg~~ POD to Rt 687 Bridge (5.1 mi, 0.25 fps)

K_1 for 15 mg/l = 0.27 @ 30C.

Sag DO = 6.1 at $t = 0.2$, at $t = 1.25$, DO = 6.5 mg/l.

Sensitivity

1) double K_1, min DO = 5.5
2) double K_n, min DO = 5.4
3) $K_2/2$, min DO = 4.8
4) double $K_1 + K_n$, $K_2/2$, min DO = 2.5

> Too Low

② Try BOD$_5$ = 10, TKN = 5 mg/l, DO = 6.5

Mass balance

$$BOD_u = \frac{25 \times 1.5 + 3 \times .093}{1.593} = 24$$

$$NOD_u = \frac{22 \times 1.5 + .5 \times .093}{1.593} = 21$$

$D_a = 1.1$, $K_{1,T_0} = 0.22$

Say DO = 6.7 at $t = 0$; at $t = 1.25$, DO = 7.0

Sensitivity

1) double K_1, min DO = 6.4
2) double K_n, min DO = 6.4
3) $K_2/2$, min DO = 6.0
4) double $K_1 + K_n$, $K_2/2$, min DO = 4.8

At Q_{STP} of 2.0 v 2.5 mgd, limits would be the same ~~due~~ because the STP flow, in effect, becomes the stream (94-96% of flow in the stream comes from the STP).

MEMORANDUM

State Water Control Board
2111 North Hamilton Street
P. O. Box 11143
Richmond, VA. 2323

SUBJECT: Q7-10 for Great Run

TO: Gary Moore, NRO

FROM: S. R. Williams, OWRP SRW

DATE: May 20, 1985

COPIES:

The drainage area for Great Run at the confluence with, and including, X-trib is 13.65 sq. mi. The drainage area for X-trib alone is 3.73 sq. mi.

Using the Cedar Run near Warrenton gage (#01655500) the Q7-10 is 0.0106 cfsm.

Therefore:

		Q7-10
Great Run:	0.0106 x 13.65 =	0.144 cfs (0.093 mgd)
X-trib:	0.0106 x 3.73 =	0.04 cfs (0.026 mgd)

hw

MEMORANDUM

State Water Control Board
2111 North Hamilton Street P. O. Box 11143 Richmond, VA. 2323

SUBJECT: Q7-10 Great Run

TO: S. R. Williams - OWRP

FROM: Gary Moore Gary Moore

DATE: May 7, 1985

COPIES:

Steve, thanks very much for your quick response to my previous request for a Q7-10 for the Rapidan River. I have one more request to ask you for, and hope that I won't have to bother you again, at least for awhile.

I need a Q7-10 for Great Run in Fauquier County, at the point where the X-trib which receives the Warrenton STP joins Great Run (see attached topo). I'll need to get a flow for the trib itself, so please include the cfs/sq mi for this area.

Again, I appreciate your timely help on these brush fires, and I am hopeful that these crises will simmer down.

Attachment

/cpm

BALDWIN & GREGG LTD
ENGINEERS · SURVEYORS · PLANNERS

SUITE 220 • TY[illegible] BUILDING • KOGER EXECUTIVE CENTER
1603 SANTA ROSA ROAD • RICHMOND, VIRGINIA 23229
TELEPHONE: (804) 282-5222

April 12, 1985

Mr. T. M. Schwarberg, Regional Director
Northern Virginia Regional Office
State Water Control Board
5515 Cherokee Avenue
Alexandria, Virginia 22312

RE: Town of Warrenton
Wastewater Facilities Plan

Dear Mr. Schwarberg:

On April 4, 1985, we met with Ms. Joan Foundas, Mr. John Hopkins and Mr. Steve Crowther of your office to discuss our preliminary findings for the above referenced project and to request your office to furnish the Town of Warrenton with effluent discharge limitations for a proposed expansion of their existing sewage treatment plant.

To provide information for the proposed plant expansion and to determine the cost/benefit of reducing infiltration/inflow in the Town's system, we are requesting that your office prepare effluent discharge limits at the existing plant outfall for average plant design flows of 1.5 MGD, 2.0 MGD and 2.5 MGD.

In addition, we wish to evaluate the feasibility of extending the existing plant's outfall along the existing creek approximately one and one half (1½) miles to its confluence with Great Run. It is anticipated that less severe effluent discharge limitations would be imposed at that location. Please provide these limits over the same range of flows as previously requested.

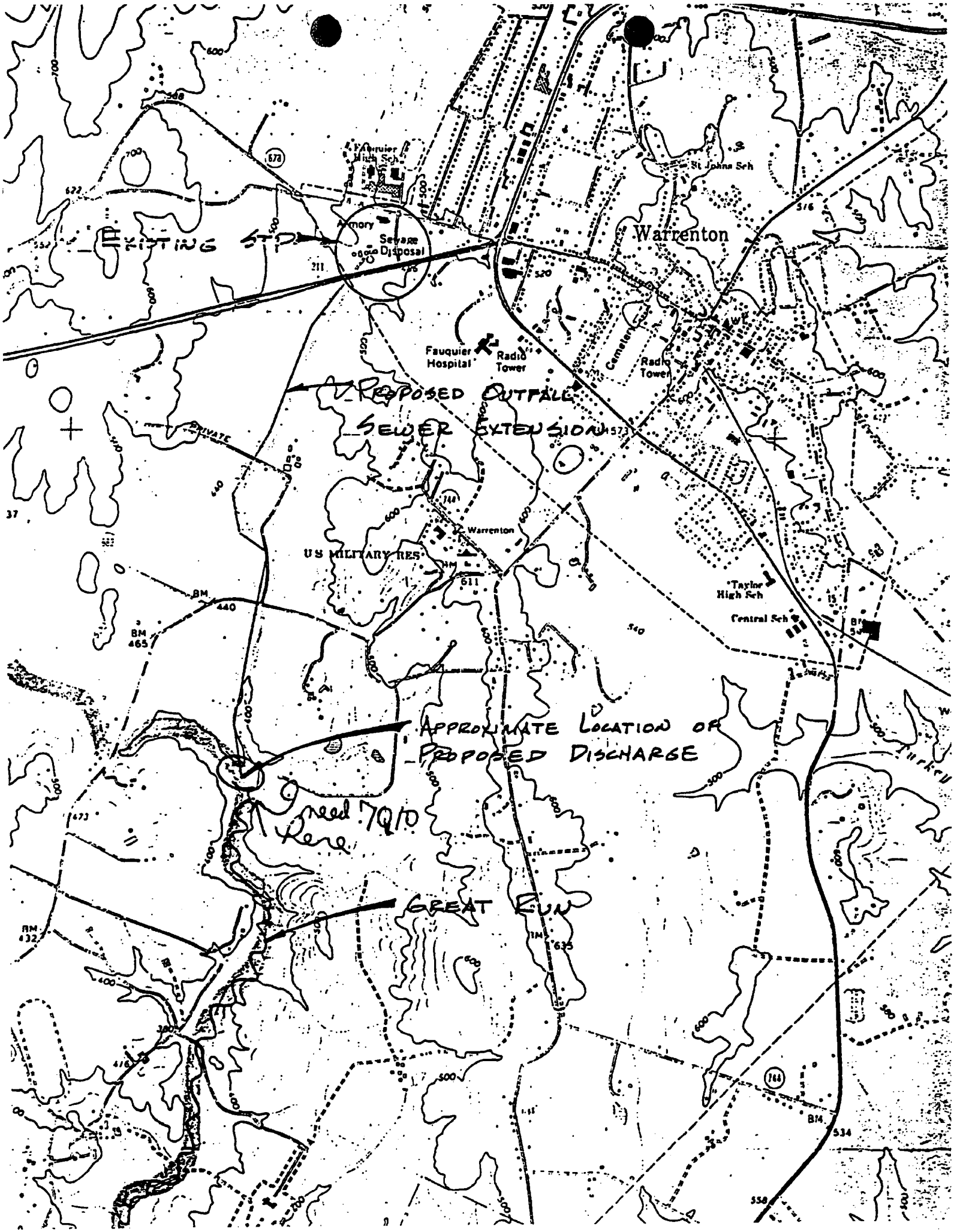
We have included a copy of a portion of the Warrenton USGS topographical map with the location of the new discharge point deliented.

We understand that your office will require at least thirty to forty-five (30-45) days to complete the analysis. Should you have any questions or require additional information, please do not hesitate to contact me.

Very truly yours,

Robert M. Gore, P.E.
Project Manager

RMG/fm
cc: Ms. Joan Foundas, SWCB
[illegible] Town of Warrenton


EXISTING STP
Armory
Sewage Disposal
Fauquier High Sch
St Johns Sch
Warrenton
Fauquier Hospital
Radio Tower
Cemetery
Radio Tower
PROPOSED OUTFALL
SEWER EXTENSION
PRIVATE
Warrenton
US MILITARY RES
Taylor High Sch
Central Sch
BM 440
BM 465
APPROXIMATE LOCATION OF
PROPOSED DISCHARGE
Need 7Q10
Here
GREAT RUN
BM 432
BM 534

CROWTHER
NRO
6/1/86

MEMORANDUM

State Water Control Board

2111 North Hamilton Street · P. O. Box 11143 · Richmond, VA. 2323

SUBJECT: Town of Warrenton

TO: Kitty Turner OERS

FROM: Steve C/NRO

DATE: 6-25-86

COPIES: File

Steve – Gary's model (technically speaking) should have consistently been used. Your results are the same; however, I think, based on our conversation yesterday that it's clear why the first modeling effort should be followed.
Kitty

The following model runs were performed for the Warrenton STP discharge. The Town Engineer requested that flows of 3.0, 3.5, 4.0, 4.5 and 5.0 MGD be run for the current discharge location. Gary Moore conducted model runs (attached) (June 5, 1985) of 1.5, 2.0, and 2.5 MGD and determined effluent limits of BOD_5 = 10 mg/L, TKN = 5 mg/L and DO = 6.5 mg/L. Using the pre-1972 "definition" for maintaining water quality standards (DO above 5.0 mg/L, including sensitivity tests), the limits indicated above are appropriate at all flows requested.

If you have any questions, give me a call.

SDM 6/27/86

ATTACHMENT 15

Nutrient Upgrade Description and Certificate to Operate

Downloadable Documents

Water Quality Improvement Fund List

Virginia Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

Contact Us:
1-(804) 698-4000
1-800-592-5482 (Toll Free in VA)

View Department of Environmental Quality Expenses

WQIF - Warrenton

Project	Grant Amount	Grant Percentage
Warrenton	$2,972,573	45%

Revolving Loan Fund Project	DEQ Regional Area	Date Agreement Signed
NA	Northern Regional Office, Woodbridge	3/15/07

Brief Project Description

The Town of Warrenton owns and operates an advanced wastewater treatment plant, VPDES Permit #VA0021172, currently rated for 2.5 million gallons per day (MGD). The existing major unit processes include head works, primary clarifiers, a trickling filter, rotating biological contactors, coagulant and polymer addition and flocculation, secondary clarifiers, chlorination, dechlorination, and post aeration. The solids handling facilities include gravity thickening, anaerobic digestion, and belt filter press dewatering. The facility was upgraded in 1990 to achieve compliance with a Total Kjeldahl Nitrogen (TKN) effluent limit and upgraded again in 1998 to achieve compliance with an ammonia effluent limit.

As a result of the Water Quality Management Planning Regulation requirements for nutrient discharge control, technology-based concentration limits for total nitrogen and total phosphorus were developed. The Preliminary Engineering Report (PER) concluded that the addition of deep bed denitrification filters with supplemental methanol addition and chemical phosphorus removal via optimized poly-aluminum chloride addition (already in place and not funded through this grant) were the recommended process alternatives. The existing wastewater treatment plant upstream of the new denitrification filters was recommended to remain in service and will continue to provide an acceptable level of reliable nitrification (ammonia control). No design flow expansion will result from this upgrade project; the plant's capacity will remain at a rating of 2.5 MGD.

The new facilities for the plant upgrade will include a filter influent pump station to lift the secondary effluent to the denitrification filters. The filter influent pumps will be located in a new Pump/Blower Building that will be constructed adjacent to the denitrification filter facility. The Pump/Blower Building will also house two positive displacement blowers that will be used for filter backwashing and will include a room for electrical equipment.

The proposed denitrification filter system will include four filter cells, a clear well to provide a reservoir for backwash water, a mud well for dirty backwash water, backwash and mud well pumps, and associated valves and control system. The deep bed denitrification filters will be located within the footprint of the existing chlorine contact tanks. The Town is proceeding with the design of a new UV disinfection facility to

replace chlorination and this project is anticipated to be completed prior to the beginning of the nutrient removal upgrade construction. Demolition of the existing chlorine contact tanks will be included in the nutrient removal upgrade project as a cost eligible component; installation of the UV disinfection is proceeding separately and is not grant eligible. The denitrification filter facility will also include an enclosed pipe gallery and a control room for the main filter control panel and nitrate analyzer.

A methanol storage and feed system will be included to provide supplemental carbon addition to the filter influent to stimulate the biological growth of the denitrifying organisms on the filter media.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

November 13, 2009

Fauquier County
Warrenton STW
24701

Mr. Edward Tucker, P.E.
Public Works Director
Town of Warrenton
P. O. Drawer 341
Warrenton, VA 20188

Dear Mr. Tucker:

Enclosed is the Certificate to Operate (CTO) for the above mentioned facility. This action is in accordance with the Virginia *Sewage Collection and Treatment Regulations.*

If you have any questions regarding the CTO, please feel free to contact this office

Sincerely,

J. S. Desai, P. E.
Office of Wastewater Engineering
Northern Regional Office

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

CERTIFICATE TO OPERATE

Owner: Town of Warrenton

Facility/System Name: Warrenton STW

VPDES Permit Number: VA0021172

Description of the Facility/System: Deep bed denitrification filters, ethanol and phosphoric acid feed systems, sodium hypochlorite feed system for Non-potable water, filter influent pump station, backwash water system, pumps, clearwell, mudwell, instrument air system, filter control system and related appurtenances.

Authorization to Operate: The owner's consulting engineer has certified in writing that the installation has been constructed as per the approved plans and specifications. The O&M Manual for this facility has been submitted. Therefore, the owner has authorization to operate the facility.

ISSUANCE:

J. S. Desai, P. E.
DEQ – Wastewater Engineering

Date: November 13, 2009

ATTACHMENT 16

Summary of Whole Effluent Test Results

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Northern Regional Office
13901 Crown Court **Woodbridge, VA 22193** **(703) 583-3800**

SUBJECT: TOXICS MANAGEMENT PROGRAM (TMP) DATA REVIEW
Warrenton Sewage Treatment Plant (VA0021172)
REVIEWER: Douglas Frasier
DATE: 14 January 2015

PREVIOUS REVIEW: 21 October 2014

DATA REVIEWED:

This review covers chronic toxicity tests conducted in December 2014 at Outfall 001.

DISCUSSION:

The results of these toxicity tests, along with the results of previous acute and chronic toxicity tests conducted on effluent samples collected from Outfall 001 are summarized in Table 1.

The chronic toxicity of the effluent samples was determined with a 3-brood static daily renewal survival and reproduction test using *C. dubia* and a 7-day daily renewal larval survival and growth test using *P. promelas* using 24-hour flow-proportioned composite samples.

Statistical analyses of the test results yielded a No Observed Effect Concentration (NOEC) of 68% effluent for *P. promelas* and 100% for *C. dubia*. A comparison sample was also tested after UV treatment due to the presence of a possible fish pathogen. Those results yielded 100% for both test species.

CONCLUSION:

The chronic toxicity tests are valid and the test results acceptable. The test results indicate that the effluent from Outfall 001 exhibit no chronic toxicity to the test species.

BIOMONITORING RESULTS

Town of Warrenton Sewage Treatment Plant (VA0021172)

Table 1
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	IC_{25} (%)	48-h LC_{50} (%)	NOEC (%)	% SURV	LAB	REMARKS
02/10/94	48-hr Acute *D. pulex*		>100		95	ESS	1st quarterly
02/10/94	96-hr Acute *P. promelas*		>100		100	ESS	
02/08/94	Chronic *C. dubia*			100 SR	100	ESS	
02/08/94	Chronic *P. promelas*			100 SG	100	ESS	
04/21/94	48-hr Acute *D. pulex*		>100		100	ESS	2nd quarterly
04/21/94	96-hr Acute *P. promelas*		>100		100	ESS	
04/19/94	Chronic *C. dubia*			100 SR	100	ESS	
04/19/94	Chronic *P. promelas*			100 SG	98	ESS	
07/14/94	48-hr Acute *D. pulex*		>100		100	ESS	3rd quarterly
07/14/94	96-hr Acute *P. promelas*		>100		100	ESS	
07/12/94	Chronic *C. dubia*			100 SR	90	ESS	
07/12/94	Chronic *P. promelas*			100 SG	90	ESS	
10/27/94	48-hr Acute *D. pulex*		>100		100	ESS	4th quarterly
10/27/94	96-hr Acute *P. promelas*		>100		100	ESS	
10/25/94	Chronic *C. dubia*			100 SR	90	ESS	
10/25/94	Chronic *P. promelas*			100 SG	95	ESS	
06/23/95	48-hr Acute *D. pulex*		>100		90	CBI	1st annaul
06/23/95	96-hr Acute *P. promelas*		>100		100	CBI	
06/20/95	Chronic *C. dubia*			12.5 R	100	CBI	
06/20/95	Chronic *P. promelas*			100 SG	93	CBI	
09/13/95	Chronic *C. dubia*			100 SR	90	CBI	retest
06/14/96	Acute *P. promelas*		INV			CBI	2nd annual
06/12/96	Chronic *C. dubia*			INV		CBI	
09/20/96	Acute *P. promelas*		>100		100	CBI	retest
09/18/96	Chronic *C. dubia*			100 SR	90	CBI	
05/15/97	Acute *P. promelas*		>100		100	CBI	3rd annual
05/13/97	Chronic *C. dubia*			100 SR	100	CBI	
05/20/98	Acute *P. promelas*		>100		95	CBI	4th annual
05/18/98	Chronic *C. dubia*			100 SR	90	CBI	
Permit reissued 29 November 1999							
04/13/00	Acute *P. promelas*		>100		100	CBI	1st annual
04/11/00	Chronic *C. dubia*			100 SR	100	CBI	
03/29/01	Acute *P. promelas*		>100		100	CBI	2nd annual
04/24/01	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	
03/28/02	Acute *P. promelas*		>100		90	CBI	3rd annual
03/26/02	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	
04/10/03	Acute *P. promelas*		INV		100	CBI	4th annual;
04/08/03	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	
06/19/03	Acute *P. promelas*		>100		100	CBI	Retest
03/24/04	Acute *P. promelas*		>100		100	CBI	5th annual
03/23/04	Chronic *C. dubia*	77.3	>100	50 SR	50	CBI	
06/16/04	Acute *P. promelas*		~~>100~~		~~100~~	CBI	Retest; **Invalid**

TEST DATE	TEST TYPE/ORGANISM	IC_{25} (%)	48-h LC_{50} (%)	NOEC (%)	% SURV	LAB	REMARKS
06/15/04	Chronic *C. dubia*	~~>100~~	~~>100~~	~~100 SR~~	~~100~~	CBI	
09/14/04	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest
Permit Reissued 16 February 2005							
04/19/05	Acute *P. promelas*		~~>100~~		~~100~~	CBI	Samples not
04/14/05	Chronic *C. dubia*	~~>100~~	~~>100~~	~~100 SR~~	~~100~~	CBI	Chilled properly
04/11/06	Chronic *C. dubia*	60.8	>100	100 S **50 G**	90	CBI	Retest
04/12/06	Acute *P. promelas*		>100		100	CBI	Retest
10/03/06	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest
05/08/07	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	3rd annual
05/08/07	Chronic *P. promelas*	>100	>100	100 SG	93		
06/03/08	Chronic *C. dubia*	>100	>100	100 SR	90	CBI	4th annual
06/03/08	Chronic *P. promelas*	>100	>100	100 SG	93		
06/16/09	Chronic *C. dubia*	>100	>100	100 SR	90	CBI	5th annual
06/16/09	Chronic *P. promelas*	>100	>100	100 SG	95		
07/06/10	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Extra test
07/06/10	Chronic *P. promelas*	>100	>100	100 SG	100		
04/05/11	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Extra test
04/05/11	Chronic *P. promelas*	>100	>100	100 S **50 G**	95		
Permit Reissued 27 April 2011							
06/26/12	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	1st annual
06/26/12	Chronic *P. promelas*	>100	>100	100 SG	100		
06/25/13	Chronic *C. dubia*	9.97	>100	100 S **8.5 R**	80	CBI	2nd annual
06/25/13	Chronic *P. promelas*	>100	>100	100 SG	100		
12/10/13	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest for 6/25/13
06/03/14	Chronic *C. dubia*	5.4	>100	100 S **<8.5 R**	100	CBI	3rd annual
06/03/14	Chronic *P. promelas*	84.5	>100	100 S **34 G**	78		
08/19/14	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest for 06/03/14
08/19/14	Chronic *P. promelas*	>100	>100	100 S **8.5 G**	90		
12/02/14	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest
12/02/14	Chronic *P. promelas*	>100	>100	100 S **68 G**	83		
12/02/14	Chronic *C. dubia*	>100	>100	100 SR	100	CBI	Retest
12/02/14	Chronic *P. promelas*	>100	>100	100 SG	98		

FOOTNOTES:

A **boldfaced** value for LC_{50} or NOEC indicates that the test failed the toxicity criteria.
LC50 based on observation at the end of 48 hours.

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth
% SURV – Percent survival in 100% effluent
INV – Invalid test
ESS – Environmental Systems Service
CBI – Coastal Bioanalysts Incorporated

ATTACHMENT 17

Calculated Compliance Endpoints for WET Requirements

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 12/13/13
File: WETLIM10.xls
(MIX.EXE required also)

Enter data in the cells with blue type:

Entry Date:	03/02/16
Facility Name:	Town of Warrenton
VPDES Number:	VA0021172
Outfall Number:	1

Plant Flow:	2.5	MGD	
Acute 1Q10:	0.011	MGD	100 %
Chronic 7Q10:	0.013	MGD	100 %

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	99.56192752	%	Plant flow/plant flow + 1Q10
IWC_c	99.48269001	%	Plant flow/plant flow + 7Q10
Dilution, acute	1.0044		100/IWCa
Dilution, chronic	1.0052		100/IWCc
WLA_a	0.30132		Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.0052		Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3.0132		ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6		Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447		Default = 0.41
eB	0.6010373		Default = 0.60
eC	2.4334175		Default = 2.43
eD	2.4334175		Default = 2.43 (1 samp)

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

No. of samples: 1

**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.

$LTA_{a,c}$	1.23825857	WLAa,c X's eA			
LTA_c	0.604162694	WLAc X's eB			
MDL** with $LTA_{a,c}$	3.013200074	TU_c	NOEC =	33.187308	(Protects from acute/chronic toxicity)
MDL** with LTA_c	1.470180072	TU_c	NOEC =	68.018879	(Protects from chronic toxicity)
AML with lowest LTA	1.470180072	TU_c	NOEC =	68.018879	Lowest LTA X's eD

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

MDL with $LTA_{a,c}$	0.301320007	TU_a	LC50 =	331.873084	%	Use NOAEC=100%
MDL with LTA_c	0.147018007	TU_a	LC50 =	680.188787	%	Use NOAEC=100%

Acute Endpoint/Permit Limit

Use as LC_{50} in Special Condition, as TUa on DMR

ACUTE 100% = NOAEC LC_{50} = NA % Use as NA TUa

ACUTE WLAa 0.30132

Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using STATS.EXE

Chronic Endpoint/Permit Limit

Use as NOEC in Special Condition, as TUc on DMR

CHRONIC	1.47018007	TU_c	NOEC =	69	% Use as	1.44 TU_c
BOTH*	3.01320007	TU_c	NOEC =	34	% Use as	2.94 TU_c
AML	1.47018007	TU_c	NOEC =	69	% Use as	1.44 TU_c

ACUTE $WLAa_{,c}$ 3.0132
CHRONIC WLAc 1.0052
* Both means acute expressed as chronic

Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using STATS.EXE

% Flow to be used from MIX.EXE

Diffuser /modeling study?
Enter Y/N n
Acute 1 :1
Chronic 1 :1

Rounded NOEC's		%
NOEC =	34	%
NOEC =	69	%
NOEC =	69	

Rounded LC50's		%
LC50 =	NA	%
LC50 =	NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847

δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.88929666

eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.086177696

δ_4 = 0.293560379

B = -0.50909823

eB = 0.601037335

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847

δ = 0.554513029

C = 0.889296658

eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = 1 This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.3074847

δ_n = 0.554513029

D = 0.889296658

eD = 2.433417525

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1			1	
2			2	
3			3	
4			4	
5			5	
6			6	
7			7	
8			8	
9			9	
10			10	
11			11	
12			12	
13			13	
14			14	
15			15	
16			16	
17			17	
18			18	
19			19	
20			20	
St Dev	NEED DATA	NEED DATA	St Dev	NEED DATA NEED DATA
Mean	0	0	Mean	0 0
Variance	0	0.000000	Variance	0 0.000000
CV	0		CV	0

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 3. Convert LC_{50}'s and NOEC's to Chronic TU's

for use in WLA.EXE

ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,

enter it here:	NO DATA	$\%LC_{50}$
	NO DATA	TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			69	1.4492754
Dilution factor to recommend:	0.5		0.8306624	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	83.1	1.20
	25.0	4.00	69.0	1.45
	12.5	8.00	57.3	1.74
	6.25	16.00	47.6	2.10
Extra dilutions if needed	3.12	32.05	39.5	2.53
	1.56	64.10	32.9	3.04

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

ATTACHMENT 18

Attachment A Review

MEMORANDUM

TO: Town of Warrenton, Permit No. VA0021172

FROM: Joan C. Crowther, NRO

SUBJECT: VA0021172 Additional Effluent Monitoring Review and Summary

DATE: August 24, 2011

The Town of Warrenton Wastewater Treatment Plant submitted on August 12, 2011, their final two additional effluent monitoring data. This effluent data were collected on May 11, 2011 and June 28, 2011. These sampling events were in accordance with VPDES Permit No. VA0021172, Part 1.F.8. Staff reviewed the data and conducted the statistical analysis to determine if any other effluent limitations were necessary to ensure that receiving stream's water quality was being protected in accordance with the Virginia Water Quality Standards (effective January 6, 2011). Based on the statistical analysis, no additional effluent limitations are necessary at this time.

Attached is the following documentation: 1) Freshwater Water Criteria/Wasteload Allocation Analysis dated December 10, 2011; 2) Statistical Analysis for Total Recoverable Copper, Total Recoverable Lead, Total Recoverable Nickel, and Total Recoverable Zinc; 3) Town of Warrenton WWTP Additional Effluent Monitoring Data collected May 11, 2011 and June 28, 2011.

ATTACHMENT 19

Public Notice

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Fauquier County, Virginia.

PUBLIC COMMENT PERIOD: June 2, 2016 to July 5, 2016

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board.

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Town of Warrenton
P.O. Drawer 341, Warrenton, VA 20188
VA0021172

NAME AND ADDRESS OF FACILITY: Town of Warrenton Wastewater Treatment Plant
731 Frost Avenue, Warrenton, VA 20186

PROJECT DESCRIPTION: The Town of Warrenton has applied for a reissuance of a permit for the Town of Warrenton Wastewater Treatment Plant. The applicant proposes to release treated sewage wastewaters from residential and light commercial areas at a rate of 2.5 million gallons per day into a water body. Sludge from the treatment process will be land applied by Synagro Central, LLC under VPA Permit No. VPA00062. The facility proposes to release the treated sewage into an unnamed tributary to Great Run in Fauquier County in the Rappahannock River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, biochemical oxygen demand 5-day, total suspended solids, dissolved oxygen, ammonia as N, E. coli, total nitrogen and total phosphorus. The facility will also monitor and report flow, total Kjeldahl nitrogen, nitrate+nitrite and whole effluent toxicity.

This facility is subject to the requirements of 9VAC25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by hand-delivery, e-mail or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the draft permit and application at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 E-mail: Douglas.Frasier@deq.virginia.gov

ATTACHMENT 20

State/Federal Agency Comments

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

December 30, 2015

Susan Mackert
DEQ – Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193

Re: VA0021172, Town of Warrenton WWTP

Dear Ms. Mackert:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Great Run Tributary above Rt. 682 Stream Conservation Unit (SCU) is located downstream from the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Great Run Tributary above Rt. 682 SCU has been given a biodiversity ranking of B4, which represents a site of moderate significance. The natural heritage resource associated with this site is:

Aquatic Natural Community (NP-Rapidan-Upper Rappahannock First Order Stream) G3?/S3?/NL/NL

The documented Aquatic Natural Community is based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river) collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Community is significant on multiple levels. First, this stream is a grade B, per the VCU-Center for Environmental Sciences (CES), indicating its relative regional significance, considering its aquatic community composition and the present-day conditions of other streams in the region. This stream reach also holds a "Healthy" stream designation per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of this stream to ideal stream conditions of biology and habitat for this region. Lastly, this stream contributes to high Biological Integrity at the watershed level (6^{th} order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Community and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species.

DCR supports the use of UV for disinfection and the discharge meeting water quality standards at the end of the pipe.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov.

Should you have any questions or concerns, feel free to contact René Hypes at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. René Hypes
Project Review Coordinator